



190

FABRICATOR MIG WELDING MACHINE



Art # A-07329

Service Manual

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Operating Features:

Issue Date: June 9, 2006

Manual No.: 0-4878B



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WARNINGS

Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.

While the information contained in this Manual represents the Manufacturer's best judgement, the Manufacturer assumes no liability for its use.

Fabricator 190 MIG Welding Machine
Service Manual Number 0-4878B for:
Package System Part Number W1001500
Power Source Part Number 707209

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82 Benning Street
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(603) 298-5711

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Publication Date: June 9, 2006

Record the following information for Warranty purposes:

Where Purchased: _____

Purchase Date: _____

Equipment Serial #: _____

TABLE OF CONTENTS

SECTION 1:	
SAFETY INSTRUCTIONS AND WARNINGS	1-1
1.01 Arc Welding Hazards	1-1
1.02 Principal Safety Standards	1-4
1.03 Precautions De Securite En Soudage A L'arc	1-5
1.04 Dangers relatifs au soudage à l'arc	1-5
1.05 Principales Normes De Securite	1-8
SECTION 2:	
INTRODUCTION	2-1
2.01 How To Use This Manual	2-1
2.02 Equipment Identification	2-1
2.03 Symbol Chart	2-2
2.04 General Information	2-3
2.05 Safety	2-3
2.06 Protective Filter Lenses	2-3
2.07 Welding Protection	2-3
2.09 User Responsibility	2-4
2.10 Duty Cycle	2-4
2.11 MIG Gun Specifications	2-4
2.12 Options and Accessories	2-4
2.13 Power Supply Specifications	2-5
2.14 Wire Drive Specifications	2-6
2.15 Fabricator 190 Package System Contents	2-6
SECTION 3:	
INSTALLATION	3-1
3.01 Environment	3-1
3.02 Location	3-1
3.03 Ventilation	3-1
3.04 Mains Supply Voltage Requirements	3-2
3.05 Quick Set Up	3-3
3.06 Installation of Shielding Gas (GMAW) Process	3-4
3.07 Attaching the Gun and Cable Assembly to the Power Source	3-6
3.08 Feedrolls	3-8
3.09 Installing Wire Spool	3-9
3.10 Inserting Wire into the Feedhead and Welding Gun	3-10
3.11 Polarity Changeover	3-12

TABLE OF CONTENTS

SECTION 4:	
OPERATION	4-1
4.01 Inside Panel	4-1
4.02 Power Supply Front Panel	4-2
4.03 TWECO Weldskill MIG Gun	4-5
4.04 Gun Consumable Parts	4-5
4.05 Installing A New Wire Conduit Liner	4-6
4.06 MIG Gun Maintenance	4-7
4.07 Basic Welding Technique	4-7
4.08 Technical Tips	4-9
4.09 Spot Welding Operation	4-10
4.10 Gas Selection for Gas Metal Arc Welding	4-11
4.11 Welding Setting Selection Guide	4-12
SECTION 5:	
MAINTENANCE	5-1
5.01 Routine Maintenance & Inspection	5-1
SECTION 6:	
TROUBLESHOOTING	6-1
6.01 Basic Troubleshooting	6-1
6.02 Solving Problems Beyond the Welding Terminals	6-1
6.03 Welding Problems	6-3
6.04 Power Supply Problems	6-5
6.05 Wire Feeder Problems	6-6
SECTION 7:	
Advanced Troubleshooting	7-1
7.01 Main Circuit Description	7-1
7.02 Test Equipment and Tools	7-1
7.03 Removal of the Covers	7-1
7.04 Pre-Power Up Checks	7-2
7.05 Initial Setup Conditions	7-2
7.06 Primary Power Test	7-2
7.07 Logic And Control Tests	7-3
7.08 Output Voltage Test	7-4
7.09 Wire Feed Test	7-4
7.10 Primary Power Problems	7-5
7.11 Logic and Control Problems	7-5
7.12 Output Voltage Problem	7-6
7.13 Wire Feed Problems	7-6
7.14 Test Procedures	7-7

TABLE OF CONTENTS

SECTION 8:	
CIRCUIT OPERATION	8-1
8.01 Circuit Operation Of The Control PCB 7977964	8-1
SECTION 9:	
PARTS LIST	9-1
9.01 Equipment Identification	9-1
9.02 How To Use This Parts List	9-1
9.03 External Replacement Parts (1)	9-2
9.04 External Replacement Parts (2)	9-4
9.05 Wire Spool Replacement Parts	9-5
9.06 Wire Feeder Parts	9-6
9.07 Electrical Components (1)	9-7
9.08 Electrical Components (2)	9-8
9.09 Wheel Axle and Body Panels	9-9
APPENDIX 1: OPTIONS AND ACCESSORIES	A-1
APPENDIX 2: OPTIONS AND ACCESSORIES (CON'T)	A-2
APPENDIX 3: POWER SUPPLY CIRCUIT DIAGRAM	A-4
APPENDIX 4: MAIN PRINTED CIRCUIT BOARD SCHEMATIC	A-6
APPENDIX 5: VOLT-AMP CURVES	A-8
LIMITED WARRANTY	
WARRANTY SCHEDULE	
GLOBAL CUSTOMER SERVICE CONTACT INFORMATION	Inside Rear Cover

SECTION 1: SAFETY INSTRUCTIONS AND WARNINGS

**WARNING**

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR. DO NOT LOSE THESE INSTRUCTIONS. READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.

Welding products and welding processes can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of welding and cutting. These practices must be learned through study and training before using this equipment. Some of these practices apply to equipment

connected to power lines; other practices apply to engine driven equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld.

Safe practices are outlined in the American National Standard Z49.1 entitled: **SAFETY IN WELDING AND CUTTING**. This publication and other guides to what you should learn before operating this equipment are listed at the end of these safety precautions. **HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.**

1.01 Arc Welding Hazards

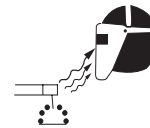
**WARNING**

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

1. Do not touch live electrical parts.
2. Wear dry, hole-free insulating gloves and body protection.
3. Insulate yourself from work and ground using dry insulating mats or covers.
4. Disconnect input power or stop engine before installing or servicing this equipment. Lock input power disconnect switch open, or remove line fuses so power cannot be turned on accidentally.
5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service.

7. Use fully insulated electrode holders. Never dip holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode.
8. Do not use worn, damaged, undersized, or poorly spliced cables.
9. Do not wrap cables around your body.
10. Ground the workpiece to a good electrical (earth) ground.
11. Do not touch electrode while in contact with the work (ground) circuit.
12. Use only well-maintained equipment. Repair or replace damaged parts at once.
13. In confined spaces or damp locations, do not use a welder with AC output unless it is equipped with a voltage reducer. Use equipment with DC output.
14. Wear a safety harness to prevent falling if working above floor level.
15. Keep all panels and covers securely in place.

**WARNING**

ARC RAYS can burn eyes and skin; NOISE can damage hearing. Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

1. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching.
2. Wear approved safety glasses. Side shields recommended.

FABRICATOR 190 WELDING MACHINE

- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.
- Use approved ear plugs or ear muffs if noise level is high.



WARNING

FUMES AND GASES can be hazardous to your health.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



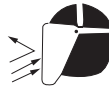
WARNING

WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks or drums.
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.

Eye protection filter shade selector for welding or cutting (goggles or helmet), from AWS A6.2-73.					
<i>Welding or cutting</i>	<i>Electrode Size</i>	<i>Filter</i>	<i>Welding or cutting</i>	<i>Electrode Size</i>	<i>Filter</i>
Torch soldering		2	Gas metal-arc		
Torch brazing		3 or 4	Non-ferrous base metal	All	11
Oxygen Cutting			Ferrous base metal	All	12
Light	Under 1 in., 25 mm	3 or 4	Gas tungsten arc welding	All	12
Medium	1 to 6 in., 25-150 mm	4 or 5	(TIG)	All	12
Heavy	Over 6 in., 150 mm	5 or 6	Atomic hydrogen welding	All	12
Gas welding			Carbon arc welding	All	12
Light	Under 1/8 in., 3 mm	4 or 5	Plasma arc welding		
Medium	1/8 to 1/2 in., 3-12 mm	5 or 6	Carbon arc air gouging		
Heavy	Over 1/2 in., 12 mm	6 or 8	Light		12
Shielded metal-arc	Under 5/32 in., 4 mm	10	Heavy		14
	5/32 to 1/4 in.,	12	Plasma arc cutting		
	Over 1/4 in., 6.4 mm	14	Light	Under 300 Amp	9
			Medium	300 to 400 Amp	12
			Heavy	Over 400 Amp	14



WARNING

FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.



WARNING

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.



WARNING

Engines can be dangerous.



WARNING

ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.

2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.



WARNING

ENGINE FUEL can cause fire or explosion.

Engine fuel is highly flammable.

1. Stop engine before checking or adding fuel.
2. Do not add fuel while smoking or if unit is near any sparks or open flames.
3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.
4. Do not overfill tank — allow room for fuel to expand.
5. Do not spill fuel. If fuel is spilled, clean up before starting engine.



WARNING

MOVING PARTS can cause injury.

Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.

1. Keep all doors, panels, covers, and guards closed and securely in place.
2. Stop engine before installing or connecting unit.
3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
4. To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
5. Keep hands, hair, loose clothing, and tools away from moving parts.
6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.



WARNING

SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.

Batteries contain acid and generate explosive gases.

1. Always wear a face shield when working on a battery.
2. Stop engine before disconnecting or connecting battery cables.
3. Do not allow tools to cause sparks when working on a battery.
4. Do not use welder to charge batteries or jump start vehicles.
5. Observe correct polarity (+ and -) on batteries.



WARNING

STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.

The coolant in the radiator can be very hot and under pressure.

1. Do not remove radiator cap when engine is hot. Allow engine to cool.
2. Wear gloves and put a rag over cap area when removing cap.
3. Allow pressure to escape before completely removing cap.



WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety code Sec. 25249.5 et seq.)

NOTE

Considerations About Welding And The Effects of Low Frequency Electric and Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric & Magnetic Fields - Background Paper, OTA-BP-E-63 (Washington, DC: U.S. Government Printing Office, May 1989): "...there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields and interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

To reduce magnetic fields in the workplace, use the following procedures.

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cable around the body.
4. Keep welding power source and cables as far away from body as practical.

ABOUT PACEMAKERS:

The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.

1.02 Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1.03 Précautions De Sécurité En Soudage A L'arc

**MISE EN GARDE**

LE SOUDAGE A L'ARC EST DANGEREUX

PROTEGEZ-VOUS, AINSI QUE LES AUTRES, CONTRE LES BLESSURES GRAVES POSSIBLES OU LA MORT. NE LAISSEZ PAS LES ENFANTS S'APPROCHER, NI LES PORTEURS DE STIMULATEUR CARDIAQUE (A MOINS QU'ILS N'AIENT CONSULTÉ UN MÉDECIN). CONSERVEZ CES INSTRUCTIONS. LISEZ LE MANUEL D'OPERATION OU LES INSTRUCTIONS AVANT D'INSTALLER, UTILISER OU ENTREtenir CET ÉQUIPEMENT.

Les produits et procédés de soudage peuvent sauser des blessures graves ou la mort, de même que des dommages au reste du matériel et à la propriété, si l'utilisateur n'adhère pas strictement à toutes les règles de sécurité et ne prend pas les précautions nécessaires.

En soudage et coupage, des pratiques sécuritaires se sont développées suite à l'expérience passée. Ces pratiques doivent être apprises par étude ou entraînement avant d'utiliser l'équipement. Toute personne n'ayant pas suivi un entraînement intensif en soudage et coupage ne devrait pas tenter de souder. Certaines pratiques concernent les équipements raccordés aux lignes d'alimentation alors que d'autres s'adressent aux groupes électrogènes.

La norme Z49.1 de l'American National Standard, intitulée "SAFETY IN WELDING AND CUTTING" présente les pratiques sécuritaires à suivre. Ce document ainsi que d'autres guides que vous devriez connaître avant d'utiliser cet équipement sont présentés à la fin de ces instructions de sécurité.

SEULES DES PERSONNES QUALIFIÉES DOIVENT FAIRE DES TRAVAUX D'INSTALLATION, DE RÉPARATION, D'ENTRETIEN ET D'ESSAI.

1.04 Dangers relatifs au soudage à l'arc

**AVERTISSEMENT**

L'ELECTROCUTION PEUT ÊTRE MORTELLE.

Une décharge électrique peut tuer ou brûler gravement. L'électrode et le circuit de soudage sont sous tension dès la mise en circuit. Le circuit d'alimentation et les circuits internes de l'équipement sont aussi sous tension dès la mise en marche. En soudage automatique ou semi-automatique avec fil, ce dernier, le rouleau ou la bobine de fil, le logement des galets d'entraînement et toutes les pièces métalliques en contact avec le fil de soudage sont sous tension. Un équipement inadéquatement installé ou inadéquatement mis à la terre est dangereux.

1. Ne touchez pas à des pièces sous tension.
2. Portez des gants et des vêtements isolants, secs et non troués.
3. Isolez-vous de la pièce à souder et de la mise à la terre au moyen de tapis isolants ou autres.
4. Déconnectez la prise d'alimentation de l'équipement ou arrêtez le moteur avant de l'installer ou d'en faire l'entretien. Bloquez le commutateur en circuit ouvert ou enlevez les fusibles de l'alimentation afin d'éviter une mise en marche accidentelle.
5. Veuillez à installer cet équipement et à le mettre à la terre selon le manuel d'utilisation et les codes nationaux, provinciaux et locaux applicables.

6. Arrêtez tout équipement après usage. Coupez l'alimentation de l'équipement s'il est hors d'usage ou inutilisé.
7. N'utilisez que des porte-électrodes bien isolés. Ne jamais plonger les porte-électrodes dans l'eau pour les refroidir. Ne jamais les laisser traîner par terre ou sur les pièces à souder. Ne touchez pas aux porte-électrodes raccordés à deux sources de courant en même temps. Ne jamais toucher quelqu'un d'autre avec l'électrode ou le porte-électrode.
8. N'utilisez pas de câbles électriques usés, endommagés, mal épissés ou de section trop petite.
9. N'enroulez pas de câbles électriques autour de votre corps.
10. N'utilisez qu'une bonne prise de masse pour la mise à la terre de la pièce à souder.
11. Ne touchez pas à l'électrode lorsqu'en contact avec le circuit de soudage (terre).
12. N'utilisez que des équipements en bon état. Réparez ou remplacez aussitôt les pièces endommagées.
13. Dans des espaces confinés ou mouillés, n'utilisez pas de source de courant alternatif, à moins qu'il soit muni d'un réducteur de tension. Utilisez plutôt une source de courant continu.
14. Portez un harnais de sécurité si vous travaillez en hauteur.
15. Fermez solidement tous les panneaux et les capots.

FABRICATOR 190 WELDING MACHINE



AVERTISSEMENT

LE RAYONNEMENT DE L'ARC PEUT BRÛLER LES YEUX ET LA PEAU; LE BRUIT PEUT ENDOMMAGER L'OUÏE.

L'arc de soudage produit une chaleur et des rayons ultraviolets intenses, susceptibles de brûler les yeux et la peau. Le bruit causé par certains procédés peut endommager l'ouïe.

1. Portez une casque de soudeur avec filtre oculaire de nuance appropriée (consultez la norme ANSI Z49 indiquée ci-après) pour vous protéger le visage et les yeux lorsque vous soudez ou que vous observez l'exécution d'une soudure.
2. Portez des lunettes de sécurité approuvées. Des écrans latéraux sont recommandés.
3. Entourez l'aire de soudage de rideaux ou de cloisons pour protéger les autres des coups d'arc ou de l'éblouissement; avertissez les observateurs de ne pas regarder l'arc.
4. Portez des vêtements en matériaux ignifuges et durables (laine et cuir) et des chaussures de sécurité.
5. Portez un casque antibruit ou des bouchons d'oreille approuvés lorsque le niveau de bruit est élevé.



AVERTISSEMENT

LES VAPEURS ET LES FUMÉES SONT DANGEREUSES POUR LA SANTÉ.

Le soudage dégage des vapeurs et des fumées dangereuses à respirer.

1. Eloignez la tête des fumées pour éviter de les respirer.
2. A l'intérieur, assurez-vous que l'aire de soudage est bien ventilée ou que les fumées et les vapeurs sont aspirées à l'arc.
3. Si la ventilation est inadéquate, portez un respirateur à adduction d'air approuvé.
4. Lisez les fiches signalétiques et les consignes du fabricant relatives aux métaux, aux produits consommables, aux revêtements et aux produits nettoyants.
5. Ne travaillez dans un espace confiné que s'il est bien ventilé; sinon, portez un respirateur à adduction d'air. Les gaz protecteurs de soudage peuvent déplacer l'oxygène de l'air et ainsi causer des malaises ou la mort. Assurez-vous que l'air est propre à la respiration.
6. Ne soudez pas à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir avec des vapeurs et former des gaz hautement toxiques et irritants.

SELECTION DES NUANCES DE FILTRES OCULAIRES POUR LA PROTECTION DES YEUX EN COUPAGE ET SOUDAGE (selon AWS à 8.2-73)

Opération de coupage ou soudage	Dimension d'électrode ou Epiasseur de métal ou Intensité de courant	Nuance de filtre oculaire	Opération de coupage ou soudage	Dimension d'électrode ou Epiasseur de métal ou Intensité de courant	Nuance de filtre oculaire
Brassage tendre au chalumeau	toutes conditions	2	Soudage à l'arc sous gaz avec fil plein (GMAW)		
Brassage fort au chalumeau	toutes conditions	3 ou 4	métaux non-ferreux	toutes conditions	11
Oxycoupage			métaux ferreux	toutes conditions	12
mince	moins de 1 po. (25 mm)	2 ou 3	Soudage à l'arc sous gaz avec électrode de tungstène (GTAW)	toutes conditions	12
moyen	de 1 à 6 po. (25 à 150 mm)	4 ou 5	Soudage à l'hydrogène atomique (AHW)	toutes conditions	12
épais	plus de 6 po. (150 mm)	5 ou 6	Soudage à l'arc avec électrode de carbone (CAW)	toutes conditions	12
Soudage aux gaz			Soudage à l'arc Plasma (PAW)	toutes dimensions	12
mince	moins de 1/8 po. (3 mm)	4 ou 5	Gougeage Air-Arc avec électrode de carbone		
moyen	de 1/8 à 1/2 po. (3 à 12 mm)	5 ou 6	mince		12
épais	plus de 1/2 po. (12 mm)	6 ou 8	épais		14
Soudage à l'arc avec électrode enrobées (SMAW)	moins de 5/32 po. (4 mm)	10	Coupage à l'arc Plasma (PAC)		
	5/32 à 1/4 po. (4 à 6.4 mm)	12	mince	moins de 300 ampères	9
	plus de 1/4 po. (6.4 mm)	14	moyen	de 300 à 400 ampères	12
			épais	plus de 400 ampères	14

7. Ne soudez des tôles galvanisées ou plaquées au plomb ou au cadmium que si les zones à souder ont été grattées à fond, que si l'espace est bien ventilé; si nécessaire portez un respirateur à aduction d'air. Car ces revêtements et tout métal qui contient ces éléments peuvent dégager des fumées toxiques au moment du soudage.

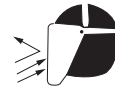


AVERTISSEMENT

LE SOUDAGE PEUT CAUSER UN INCENDIE OU UNE EXPLOSION

L'arc produit des étincelles et des projections. Les particules volantes, le métal chaud, les projections de soudure et l'équipement surchauffé peuvent causer un incendie et des brûlures. Le contact accidentel de l'électrode ou du fil-électrode avec un objet métallique peut provoquer des étincelles, un échauffement ou un incendie.

1. Protégez-vous, ainsi que les autres, contre les étincelles et du métal chaud.
2. Ne soudez pas dans un endroit où des particules volantes ou des projections peuvent atteindre des matériaux inflammables.
3. Enlevez toutes matières inflammables dans un rayon de 10, 7 mètres autour de l'arc, ou couvrez-les soigneusement avec des bâches approuvées.
4. Méfiez-vous des projections brûlantes de soudage susceptibles de pénétrer dans des aires adjacentes par de petites ouvertures ou fissures.
5. Méfiez-vous des incendies et gardez un extincteur à portée de la main.
6. N'oubliez pas qu'une soudure réalisée sur un plafond, un plancher, une cloison ou une paroi peut enflammer l'autre côté.
7. Ne soudez pas un récipient fermé, tel un réservoir ou un baril.
8. Connectez le câble de soudage le plus près possible de la zone de soudage pour empêcher le courant de suivre un long parcours inconnu, et prévenir ainsi les risques d'électrocution et d'incendie.
9. Ne dégelez pas les tuyaux avec une source de courant.
10. Otez l'électrode du porte-électrode ou coupez le fil au tube-contact lorsqu'inutilisé après le soudage.
11. Portez des vêtements protecteurs non huileux, tels des gants en cuir, une chemise épaisse, un pantalon revers, des bottines de sécurité et un casque.



AVERTISSEMENT

LES ETINCELLES ET LES PROJECTIONS BRULANTES PEUVENT CAUSER DES BLESSURES.

Le piquage et le meulage produisent des particules métalliques volantes. En refroidissant, la soudure peut projeter des éclats de laitier.

1. Portez un écran facial ou des lunettes protectrices approuvées. Des écrans latéraux sont recommandés.
2. Portez des vêtements appropriés pour protéger la peau.



AVERTISSEMENT

LES BOUTEILLES ENDOMMAGEES PEUVENT EXPLOSER

Les bouteilles contiennent des gaz protecteurs sous haute pression. Des bouteilles endommagées peuvent exploser. Comme les bouteilles font normalement partie du procédé de soudage, traitez-les avec soin.

1. Protégez les bouteilles de gaz comprimé contre les sources de chaleur intense, les chocs et les arcs de soudage.
2. Enchaînez verticalement les bouteilles à un support ou à un cadre fixe pour les empêcher de tomber ou d'être renversées.
3. Eloignez les bouteilles de tout circuit électrique ou de tout soudage.
4. Empêchez tout contact entre une bouteille et une électrode de soudage.
5. N'utilisez que des bouteilles de gaz protecteur, des détendeurs, des boyaux et des raccords conçus pour chaque application spécifique; ces équipements et les pièces connexes doivent être maintenus en bon état.
6. Ne placez pas le visage face à l'ouverture du robinet de la bouteille lors de son ouverture.
7. Laissez en place le chapeau de bouteille sauf si en utilisation ou lorsque raccordé pour utilisation.
8. Lisez et respectez les consignes relatives aux bouteilles de gaz comprimé et aux équipements connexes, ainsi que la publication P-1 de la CGA, identifiée dans la liste de documents ci-dessous.



AVERTISSEMENT

LES MOTEURS PEUVENT ETRE DANGEREUX

LES GAZ D'ECHAPPEMENT DES MOTEURS PEUVENT ETRE MORTELS.

Les moteurs produisent des gaz d'échappement nocifs.

FABRICATOR 190 WELDING MACHINE

1. Utilisez l'équipement à l'extérieur dans des aires ouvertes et bien ventilées.
2. Si vous utilisez ces équipements dans un endroit confiné, les fumées d'échappement doivent être envoyées à l'extérieur, loin des prises d'air du bâtiment.



AVERTISSEMENT

LE CARBURANT PEUT CAUSER UN INCENDIE OU UNE EXPLOSION.

Le carburant est hautement inflammable.

1. Arrêtez le moteur avant de vérifier le niveau de carburant ou de faire le plein.
2. Ne faites pas le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.
3. Si c'est possible, laissez le moteur refroidir avant de faire le plein de carburant ou d'en vérifier le niveau au début du soudage.
4. Ne faites pas le plein de carburant à ras bord: prévoyez de l'espace pour son expansion.
5. Faites attention de ne pas renverser de carburant. Nettoyez tout carburant renversé avant de faire démarrer le moteur.



AVERTISSEMENT

DES PIÈCES EN MOUVEMENT PEUVENT CAUSER DES BLESSURES.

Des pièces en mouvement, tels des ventilateurs, des rotors et des courroies peuvent couper doigts et mains, ou accrocher des vêtements amples.

1. Assurez-vous que les portes, les panneaux, les capots et les protecteurs soient bien fermés.
2. Avant d'installer ou de connecter un système, arrêtez le moteur.
3. Seules des personnes qualifiées doivent démonter des protecteurs ou des capots pour faire l'entretien ou le dépannage nécessaire.
4. Pour empêcher un démarrage accidentel pendant l'entretien, débranchez le câble d'accumulateur à la borne négative.
5. N'approchez pas les mains ou les cheveux de pièces en mouvement; elles peuvent aussi accrocher des vêtements amples et des outils.
6. Réinstallez les capots ou les protecteurs et fermez les portes après des travaux d'entretien et avant de faire démarrer le moteur.



AVERTISSEMENT

DES ETINCELLES PEUVENT FAIRE EXPLOSER UN ACCUMULATEUR; L'ELECTROLYTE D'UN ACCUMULATEUR PEUT BRULER LA PEAU ET LES YEUX.

Les accumulateurs contiennent de l'électrolyte acide et dégagent des vapeurs explosives.

1. Portez toujours un écran facial en travaillant sur un accumulateur.
2. Arrêtez le moteur avant de connecter ou de déconnecter des câbles d'accumulateur.
3. N'utilisez que des outils anti-étincelles pour travailler sur un accumulateur.
4. N'utilisez pas une source de courant de soudage pour charger un accumulateur ou survolter momentanément un véhicule.
5. Utilisez la polarité correcte (+ et -) de l'accumulateur.



AVERTISSEMENT

LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT BRULANT SOUS PRESSION PEUVENT BRULER LA PEAU ET LES YEUX.

Le liquide de refroidissement d'un radiateur peut être brûlant et sous pression.

1. N'ôtez pas le bouchon de radiateur tant que le moteur n'est pas refroidi.
2. Mettez des gants et posez un torchon sur le bouchon pour l'ôter.
3. Laissez la pression s'échapper avant d'ôter complètement le bouchon.

1.05 Principales Normes De Sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

Safety and Health Standards, OSHA 29 CFR 1910, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

National Electrical Code, norme 70 NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, document P-1, Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, norme CSA W117.2 Association canadienne de normalisation, Standards Sales, 276 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, norme ANSI Z87.1, American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme 51B NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

SECTION 2: INTRODUCTION

2.01 How To Use This Manual

This Service Manual applies to just specification or part numbers listed on page i.

To ensure safe operation, read the entire manual, including the chapter on safety instructions and warnings.

Throughout this manual, the words **WARNING**, **CAUTION**, and **NOTE** may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:



WARNING

A WARNING gives information regarding possible personal injury.



CAUTION

A CAUTION refers to possible equipment damage.

NOTE

A NOTE offers helpful information concerning certain operating procedures.

Additional copies of this manual may be purchased by contacting Thermal Arc at the address and phone number in your area listed in the inside back cover of this manual. Include the Service Manual number and equipment identification numbers.

Electronic copies of this manual can also be downloaded at no charge in Acrobat PDF format by going to the Thermal Arc web site listed below and clicking on the Literature link:

<http://www.thermalarc.com>

2.02 Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a nameplate attached to the rear panel. In some cases, the nameplate may be attached to the control panel. Equipment which does not have a name plate such as gun and cable assemblies is identified only by the specification or part number printed on the shipping container. Record these numbers on the bottom of page i for future reference.

FABRICATOR 190 WELDING MACHINE

2.03 Symbol Chart

Note that only some of these symbols will appear on your model.

	On
	Off
	Dangerous Voltage
	Increase/Decrease
	Circuit Breaker
	AC Auxiliary Power
	Fuse
A	Amperage
V	Voltage
Hz	Hertz (cycles/sec)
f	Frequency
	Negative
	Positive
	Direct Current (DC)
	Protective Earth (Ground)
	Line
	Line Connection
	Auxiliary Power
115V 15A 	Receptacle Rating-Auxiliary Power

1	Single Phase
3	Three Phase
	Three Phase Static Frequency Converter-Transformer-Rectifier
	Remote
X	Duty Cycle
%	Percentage
	Panel/Local
	Shielded Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)
	Gas Tungsten Arc Welding (GTAW)
	Air Carbon Arc Cutting (CAC-A)
	Constant Current
	Constant Voltage Or Constant Potential
	High Temperature
	Fault Indication
	Arc Force
	Touch Start (GTAW)
	Variable Inductance
	Voltage Input

	Wire Feed Function
	Wire Feed Towards Workpiece With Output Voltage Off.
	Welding Gun
	Purging Of Gas
	Continuous Weld Mode
	Spot Weld Mode
	Spot Time
	Preflow Time
	Postflow Time
2 Step Trigger Operation Press to initiate wirefeed and welding, release to stop.	
4 Step Trigger Operation Press and hold for preflow, release to start arc. Press to stop arc, and hold for preflow.	
	Burnback Time
	Disturbance In Ground System
IPM	Inches Per Minute
MPM	Meters Per Minute

Art # A-04130

2.04 General Information

The Fabricator 190 is a semiautomatic Gas Metal Arc Welder (GMAW/FCAW-commonly MIG) with an integrated wire feed unit. The Fabricator 190 is designed and manufactured to meet the requirements of CSA and IEC 60974-1 standards.

The Fabricator 190 gives excellent performance on mild steel, stainless steel, aluminum, silicon bronze and some hard facing wires with Argon based shielding gases. The Power Supply also gives excellent results on mild steel using Carbon Dioxide shielding gas.

The Fabricator 190 is supplied as a complete, ready-to-weld package including a wheel base, cylinder tray, MIG gun, work lead, and flow regulator. The following instructions detail how to correctly set up the welder and give guidelines on gaining the best production efficiency from the Power Supply. Please read these instructions thoroughly before using your Fabricator welder.

2.05 Safety

The following basic safety rules should always be followed:

Ensure the machine is correctly installed, if necessary, by a qualified electrician.

Ensure the Power Supply is grounded correctly (electrically) in accordance with local regulations.

Excessive heat in the welding cables may cause fire. Never weld with poor electrical connections, damaged welding cables or exceed the welding cable current rating as this will produce excessive heat and may cause a fire.

Always wear the correct protective clothing for protection from sparks, molten particles and arc rays.

When welding in confined spaces, always ensure adequate ventilation and constant observation of the operator.

Keep combustible materials away from the welding area. Have a suitable fire extinguisher handy.

Never watch the welding arc with naked eyes. Always use and wear a welding mask fitted with the correct filter lens.

Do not stand on damp ground when welding.

For more complete safety advice, please read Section 1.

2.06 Protective Filter Lenses

Protective filter lenses are provided to reduce the intensity of radiation entering the eye thus filtering out harmful infrared, ultraviolet radiation and a percentage of the visible light. Such filter lenses are incorporated within face shields. To prevent damage to the filter lenses from molten or hard particles an additional hard clear glass or special plastic external cover lens should be used. This cover lens should always be kept in place and replaced before the damage impairs your vision while welding.

2.07 Welding Protection

Approximate range of welding current	Filter lens required for MIG
Up to 150	Shade 10
150-250	Shade 11
250-300	Shade 12
300-350	Shade 13
Over 350	Shade 14

Filter Lens Size Versus Welding Current

It is recommended to use a welding helmet, conforming to the local relevant Standards when electric arc welding. Use a welding helmet in serviceable condition with the correct filter lens. Refer to Table 2-1 above and AWS table in Section 1.01 of this manual.

FABRICATOR 190 WELDING MACHINE

2.09 User Responsibility

This equipment will perform as per the information contained herein when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Defective equipment (including welding leads) should not be used. Parts that are broken, missing, plainly worn, distorted or contaminated, should be replaced immediately. Should such repairs or replacements become necessary, it is recommended that such repairs be carried out by appropriately qualified persons approved by Thermal Arc. Advice in this regard can be obtained by contacting Thermal Arc.

This equipment or any of its parts should not be altered from standard specification without prior written approval of Thermal Arc. The purchaser of this equipment shall have the sole responsibility for any malfunction which results from improper use or unauthorized modification from standard specification, faulty maintenance, damage or improper repair by anyone other than appropriately qualified persons approved by Thermal Arc.

2.10 Duty Cycle

Duty Cycle is the amount of arc-on time (actual welding or cutting time) during any 10 minute period that a machine can operate at it's rated output without damaging internal components. For example, the Fabricator 190 is designed for 15% duty cycle at 190 amps. This means that it has been designed and built to provide the rated amperage, 190 amps, for 1 minute and 30 seconds out of every 10 minute period. During the other 8 minutes 30 seconds of the 10 minute period the Fabricator 190 must idle and be allowed to cool. The thermal cutout will operate if the duty cycle is exceeded.

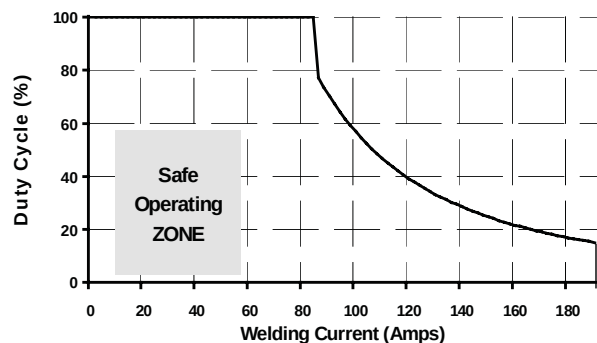


Figure 2-1: Fabricator 190 Duty Cycle Curve

2.11 MIG Gun Specifications

MIG Gun Specifications	
Gun Catalog Number	10217
Gun Type	TWECO Weldskill 200 Amp
Gun Cable Length	10ft (3m)

2.12 Options and Accessories

Refer to the Appendix section of this manual for the list of available options and accessories for this product.

2.13 Power Supply Specifications

Package System Part Number	W1001500
Power Source Part Number	707209
Power Source Weight	128lb (58kg)
Power Source Dimensions HxWxD (including wheels and cylinder carrier)	33 x 16.3 x 34.7" (838 x 414 x 866mm)
Number of Phases	1Ø
Frequency	60 Hz
Flexible Supply Cable Size	10ft (3m) 10AWG x 3
Supply Plug	NEMA 6-50P
Nominal Input Voltage	230V ± 10%
Rated Input Current @ 100% Duty Cycle	* 11A
Rated kVA @ 100% Duty Cycle	* 2.5 kVA
Maximum Input Current @ 190A Output @230V	34A
Generator Requirements	10 kVA
Supply VA @ Maximum Output	7.9 kVA
Recommended Primary Circuit Size	50A
Recommended Minimum Primary Fuse Size	** 30A
Open Circuit Voltage Range	26 – 60V DC
Welding Arc Voltage Range	15.8 – 25V DC
Output Current Range	30 – 190A DC
Rated Output Duty Cycle	190A/23.4V @ 15%
100% Duty Cycle Output Rating	85A DC at 19V
Duty Cycle Period	10 minutes
Number of Output Voltage Values	8
Electrode Wire Type and Diameter Mild / Stainless Steel Aluminum Flux Cored	.023" (0.6mm) – .035" (0.9mm) .030" (0.8mm) – .045" (0.9mm) .030" (0.8mm) – .045" (1.2mm)
Wire Feed Speed Range	80 – 700 ipm (2 – 18 m/min)
Wire Spool Size Diameter	8" / 12" (200mm / 300mm)
Burn-back Timer Range Burn-back Time Factory Set to:	0 – 0.6 seconds 0.16 seconds
Spot Timer Range	0.5 – 4.5 seconds
Thermal Protection	Self-resetting thermostat fitted to rectifier and transformer
Operating Temperature Range	32° to 104°F (0° to 40°C)

* The Rated Input Current should be used for the determination of cable size & supply requirements.

FABRICATOR 190 WELDING MACHINE

2.14 Wire Drive Specifications

Wire Drive Specifications				
Control Circuit Supply	30VA @ 24VAC			
Wire Drive Motor Supply	40VA @ 2 to 24VDC (Intermittent Duty)			
Wire Speed Range	80 to 700 IPM (2 to 18 m/min)			
Wire Diameters Material	.023" (0.6mm)	.030" (0.8mm)	.035" (0.9mm)	.045" (1.2mm)
Mild Steel	•	•	•	
Stainless Steel	•	•	•	
Aluminum		•	•	
Flux Cored		•	•	•
Wire Spool Capacity	44 lb, 33 lb, 10 lb, 8" and 12" wire spool sizes			

2.15 Fabricator 190 Package System Contents

Fabricator 190 Package System Contents
Fabricator 190 Power Source with Integrated Wirefeeder
Factory Fitted Wheeling Kit
Factory Fitted Single Cylinder Rack
Factory Fitted Primary Power Cable 10 AWG, 10ft (3m) with Plug NEMA 6-50P
Work Lead 10ft (3m) with work clamp
Regulator/Flowmeter – Argon Mix Gases
Tweco Weldskill MIG Gun 200 Amp, 10ft (3m)
Fitted Feed Roll for .023" - .030" (0.6 – 0.8mm) solid wire

SECTION 3: INSTALLATION

3.01 Environment

The Fabricator 190 is NOT designed for use in environments with increased hazard of electric shock.

Examples of environments with increased hazard of electric shock are:

In locations in which freedom of movement is restricted, so that the operator is forced to perform the work in a cramped (kneeling, sitting or lying) position with physical contact with conductive parts;

In locations which are fully or partially limited by conductive elements, and in which there is a high risk of unavoidable or accidental contact by the operator, or

In wet or damp hot locations where humidity or perspiration considerably reduces the skin resistance of the human body and the insulation properties of accessories.

Environments with increased hazard of electric shock do not include places where electrically conductive parts in the near vicinity of the operator, which can cause increased hazard, have been insulated.

3.02 Location

Be sure to locate the Power Supply according to the following guidelines:

In areas, free from moisture and dust.

In areas, free from oil, steam and corrosive gases.

In areas, not subjected to abnormal vibration or shock.

In areas, not exposed to direct sunlight or rain.

Place at a distance of 1ft (300mm) or more from walls or similar that could restrict natural air flow for cooling.

The minimum ground clearance for these products is 5.5" (140mm).

3.03 Ventilation

Since the inhalation of welding fumes can be harmful, ensure that the welding area is effectively ventilated.

FABRICATOR 190 WELDING MACHINE

3.04 Mains Supply Voltage Requirements

The Mains supply voltage should be within $\pm 10\%$ of the rated Mains supply voltage. Too low a voltage may cause poor welding performance or the wirefeeder malfunction. Too high a supply voltage will cause components to overheat and possibly fail. The Fabricator 190 is supplied with a 10 AWG x 3 supply lead.

Install a power outlet for each Power Supply and fit fuses as per the machine specifications.



WARNING

Thermal Arc advises that your Fabricator be electrically connected by a qualified electrical trades-person.

The Fabricator 190 Power Supply is factory connected for the following input power supply voltage:

Input Power Supply Lead Size	Lead Current Rating	Lead Length	Machine Voltage Setting	Duty Cycle
10 AWG x 3	40 Amps	10ft (3m)	230V	190A @ 15%

Table 3-1: Factory Fitted Input Power Supply Leads Fitted to the Fabricator 190

3.05 Quick Set Up

**CAUTION**

To obtain adequate air flow and cooling for the Power Supply components, the four wheels must be fitted. Alternatively, the Power Supply may be raised 5.5" (140 mm) from the floor using supports that do not restrict airflow.

NOTE

The steps in this subsection are intended for individuals experienced in the set up of this type welder. More detailed setup instructions are in the 3.06 and following subsections.

1. Connect the work lead to the negative (-) socket (positive + for Self Shielded Flux Cored Wire)
2. Connect the *GUN* lead to the positive (+) socket (negative - for Self Shielded Flux Cored Wire)

NOTE

See Section 3.11 "Polarity Changeover" for more detail and exceptions!

3. Position a gas cylinder on the rear tray and secure to the Power Supply cylinder bracket with the chain provided. If this arrangement is not used then ensure that the gas cylinder is secured to a building pillar, wall bracket or otherwise securely fixed in an upright position.

**WARNING**

If the gas cylinder is not secured to the cylinder tray, the power supply must be kept from moving to avoid over-extending the gas hose which can result in personal injury, damage to the power supply, flowmeter and gas cylinder.

4. Fix the cable stowage hook to the Power Supply cylinder bracket with the bolts provided.
5. Fit the gas Regulator/Flowmeter to the gas cylinder and connect the gas hose from the rear of the Power Supply to the Flowmeter outlet.
6. The machine is fitted with a .023"/.030" vee groove feed roll suited for hard wire. Change this feed roll if required to fit your chosen wire size.
7. Fit the electrode wire spool to the wire reel hub located behind the electrode wire compartment door.
8. Fit the TWECO Weldskill MIG gun and trigger wires through/to the front of the unit.
9. Remove the contact tip from the gun.
10. With the gun lead reasonably straight, feed the wire through the wire drive rolls and gun.
11. Fit the appropriate contact tip and replace insulator and nozzle.

FABRICATOR 190 WELDING MACHINE

3.06 Installation of Shielding Gas (GMAW) Process

Refer to Figure 3-2.

NOTE

Shielding Gas is not required if the unit is used self shielded FCAW (flux cored arc welding) wires

Cylinder positioning

Chain the cylinder to a wall or other support to prevent the cylinder from falling over. If an optional portable mounting is used, follow the instructions provided with it.

Cracking

Remove the large metal cap on top of the cylinder by rotating counter clockwise. Next remove the dust seal. Position yourself so the valve is pointed away from you and quickly open and close the valve for a burst of gas. This is called “Cracking” and is done to blow out any foreign matter that may be lodged in the fitting. (Fig 3-2.)



CAUTION

Never “crack” a fuel gas cylinder valve near other welding works, sparks or open flames. Ensure surrounding area is well ventilated

Regulators – fitting to cylinders

Screw the regulator into the appropriate cylinder. The nuts on the regulator and hose connections are right hand (RH) threaded and need to be turned in a clockwise direction in order to tighten. Tighten with a wrench.



CAUTION

Match regulator to cylinder. NEVER CONNECT a regulator designed for a particular gas or gases to a cylinder containing any other gas.

Regulators – fitting to welder.

Blow out the hose before connecting to the regulator and rear of welding power source – to remove dust, talc, etc. The nut on the hose connection is right hand (RH) threaded and needs to be turned in a clockwise direction in order to tighten.

Adjusting Regulator

Adjust control knob of regulator to the required flow rate, indicated on gauge dial. (Refer to Figure 3-1 and data charts Approx. 20 CFH.

The gas flow rate should be adequate to cover the weld zone to stop weld porosity. Excessive gas flow rates may cause turbulence and weld porosity.

Argon or argon based gas flow rates:

- Workshop welding: 20-30 CFH
- Outdoors welding: 30-40 CFH

Helium based or CO2 gas flow rates:

- Workshop welding: 30-40 CFH
- Outdoors welding: 40-50 CFH

NOTE

All valves downstream of the regulator must be opened to obtain a true flow rate reading on the outlet gauge. (Welding power source must be triggered) Close the valves after the pressure has been set.

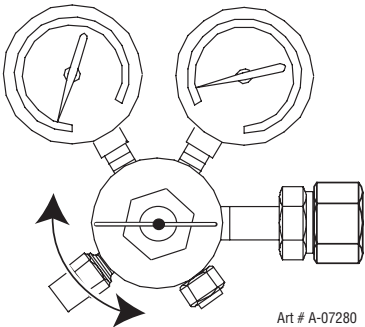
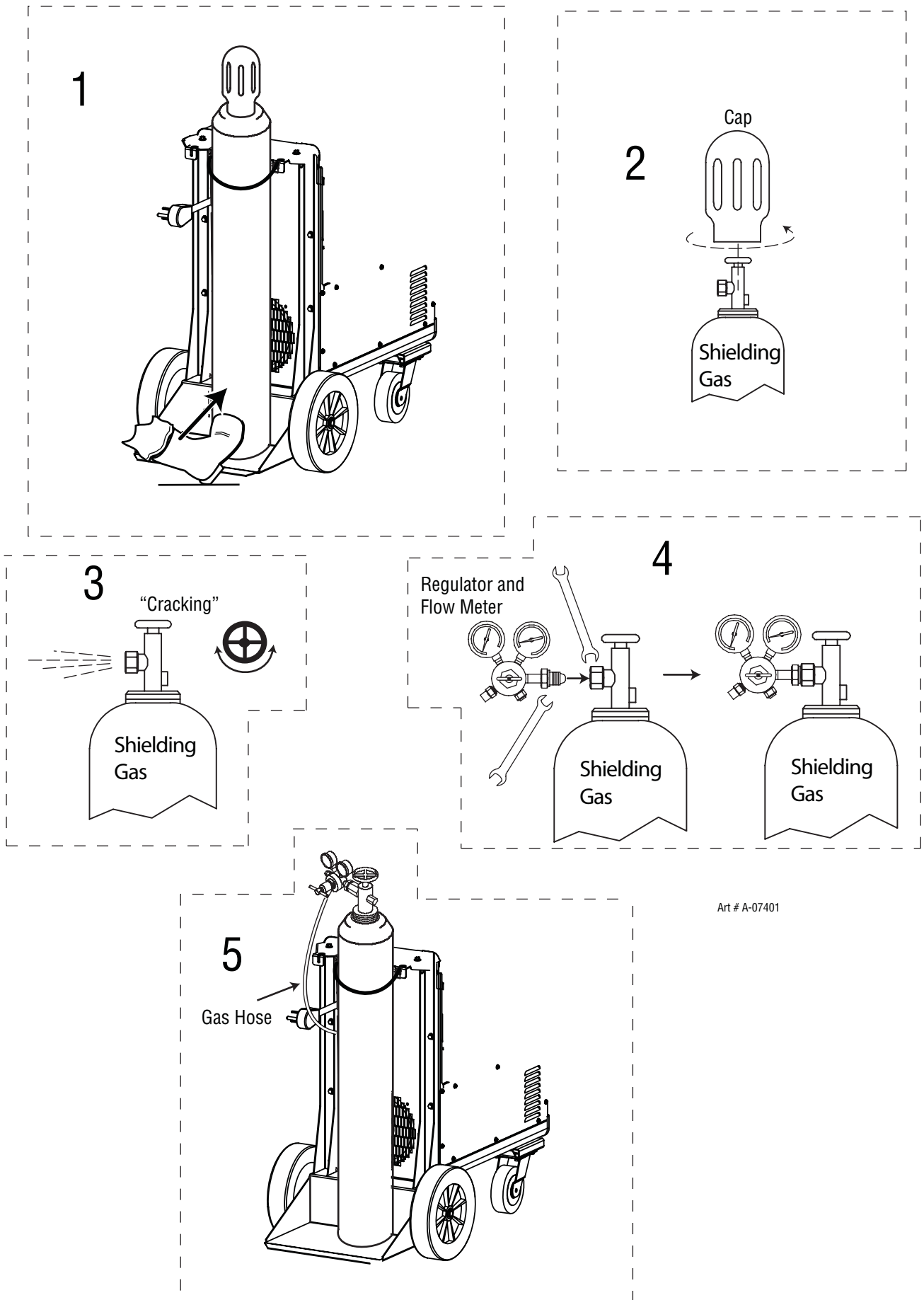


Figure 3-1: Adjusting Flow Rate

Refer to section 4.10 for suggested gas / filler metal combinations.

NOTE

The regulator/flow meters used with argon based and carbon dioxide shielding gases are different. The regulator/flow meter supplied is for argon based shielding gases. If carbon dioxide is to be used a suitable carbon dioxide regulator/flow meter will need to be fitted.



Art # A-07401

Figure 3-2: Gas Cylinder Installation

FABRICATOR 190 WELDING MACHINE

3.07 Attaching the Gun and Cable Assembly to the Power Source

The Fabricator 190 is supplied with a Tweco Weldskill gun 190 10217 air-cooled torch. The Weldskill gun is designed with an ergonomic handle and fewer parts to cause performance problems. The Weldskill gun uses standard readily available Tweco consumable parts.

- 1) Remove the door panel to the machine by inserting your left and right index fingers into the two holes marked with arrows in Figure 3-3 and firmly pull it towards you.
- 2) Route the gun cable through the access hole in the front panel. Refer to Figure 3-4.
- 3) Loosen the thumbscrew and insert the gun cable end as far as it will go. Tighten thumbscrew. Refer to Figure 3-5.

NOTE

Lubricate the O-ring on the quick-connect fitting with grease (Dow company #4 compound or equivalent).

- 4) To remove the gun, reverse these directions.

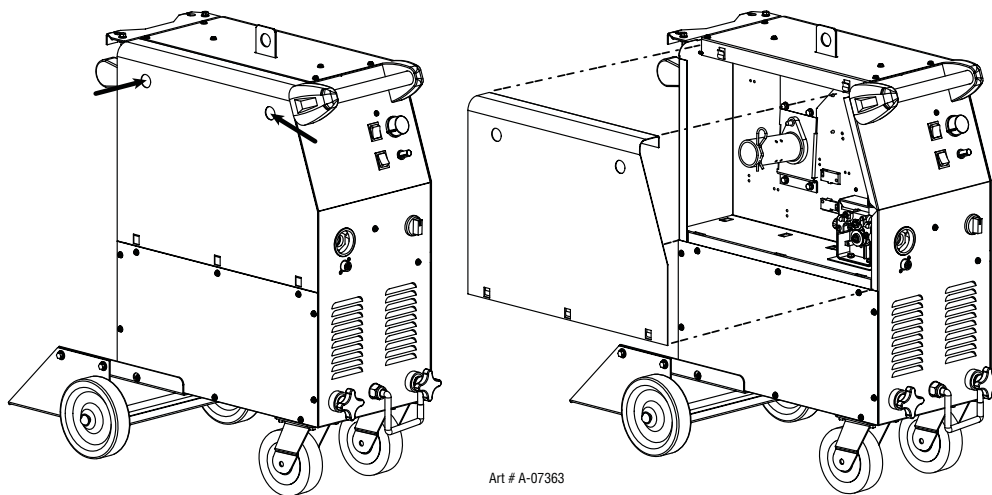


Figure 3-3: Door Panel Removal

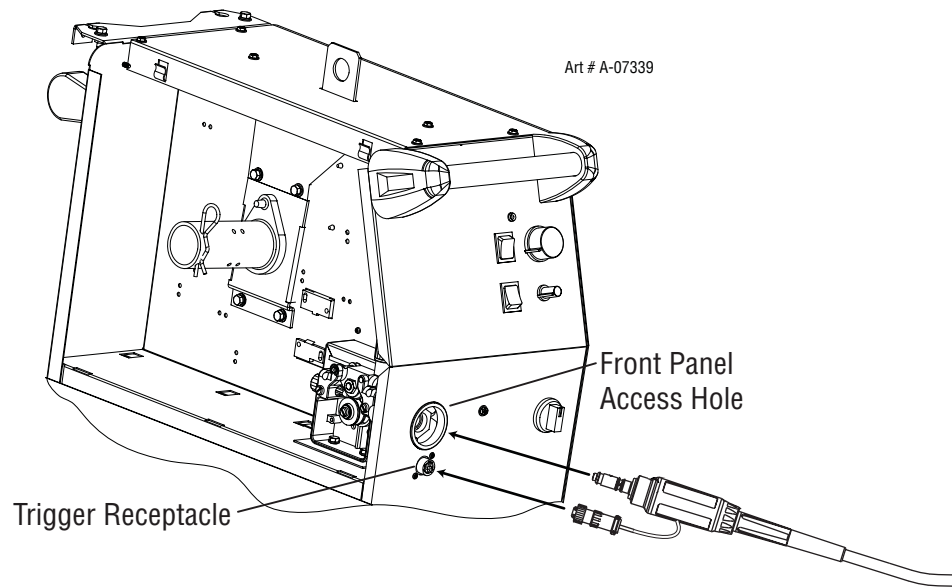


Figure 3-4: Route Gun Cable Through Access Hole and Connect Trigger

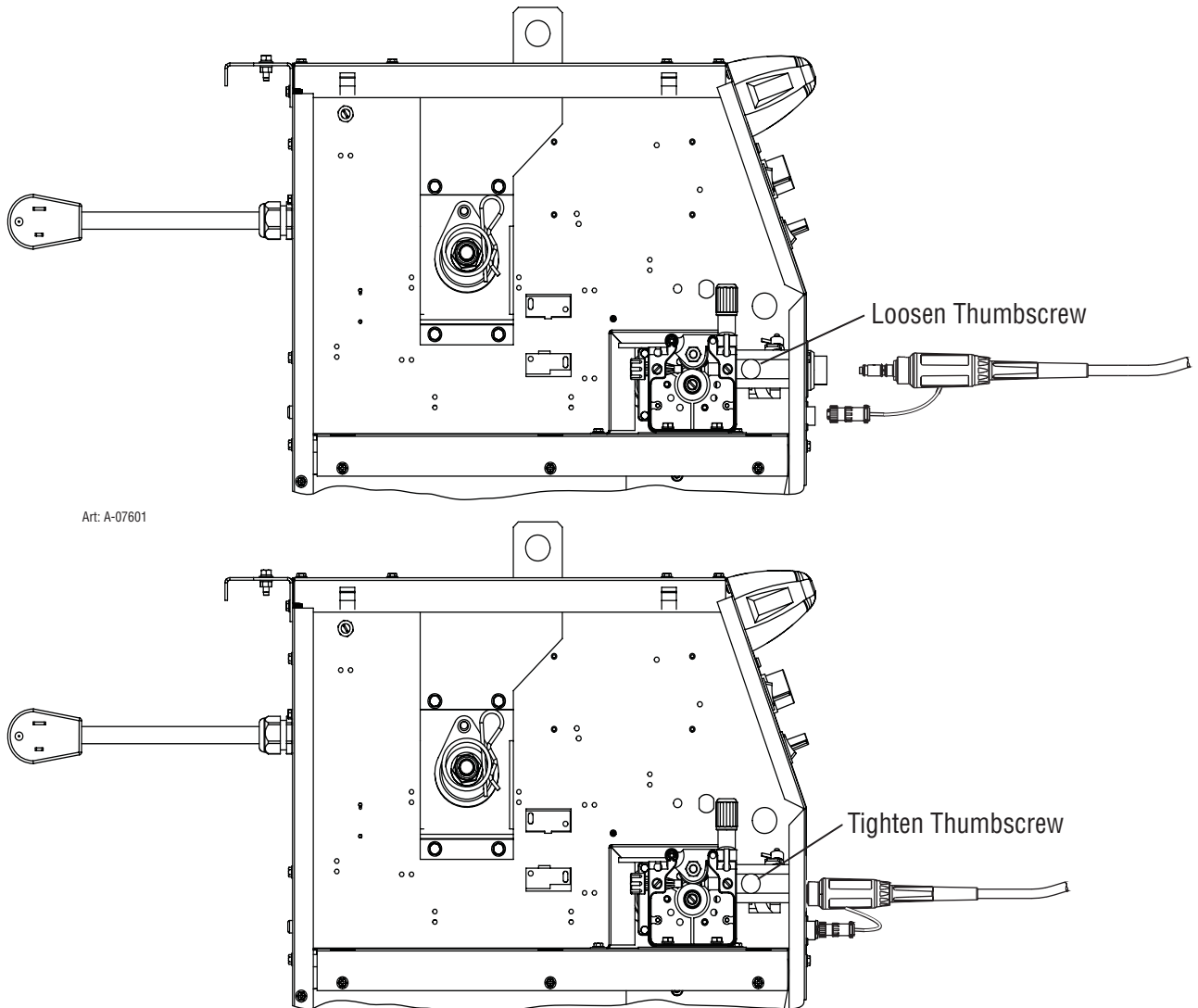


Figure 3-5: Mount Gun Cable to Adapter Socket

FABRICATOR 190 WELDING MACHINE

3.08 Feedrolls

A feedroll consists of two different sized grooves. As delivered from the factory, the feedroll is installed for .023" (0.6mm).

When the feedroll is installed, the visibly marked size refers to the groove which will be in use.

The groove closest to the motor is the one to thread the wire through.

This also applies to optional feedrolls which are available for this machine.

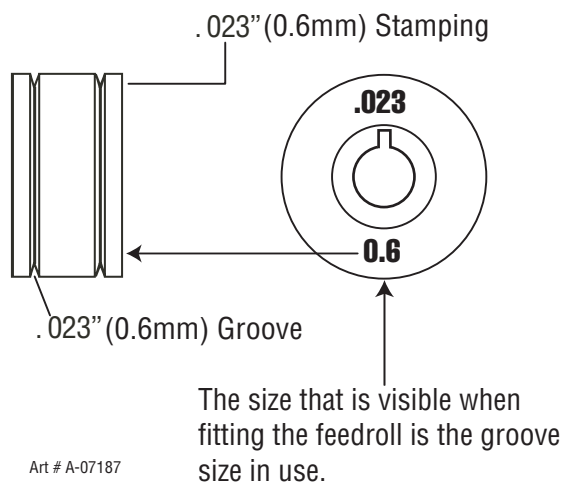


Figure 3-6: Feedroll Example

Refer to the Options and Accessories list in the Appendix section of this manual for information on additional feed roll kits.

3.09 Installing Wire Spool

Installation of 8" (203mm) spool

1. Remove the spool retaining pin (6) from spool hub (7).
2. Fit the spool (5) onto the spool hub (7).
3. Ensure that the drive pin engages the mating hole in the spool.
4. Push the spool retaining pin (6) into place in the spool hub (7).

NOTE

Nut is tightened until a slight force is required to turn the spool

Installation of 12" (300mm) spool

Installation of a 12" (300mm) spool is the same as the 8" (203mm) spool except that the Spool Retaining Pin will go into the outer holes of the Spool Hub.

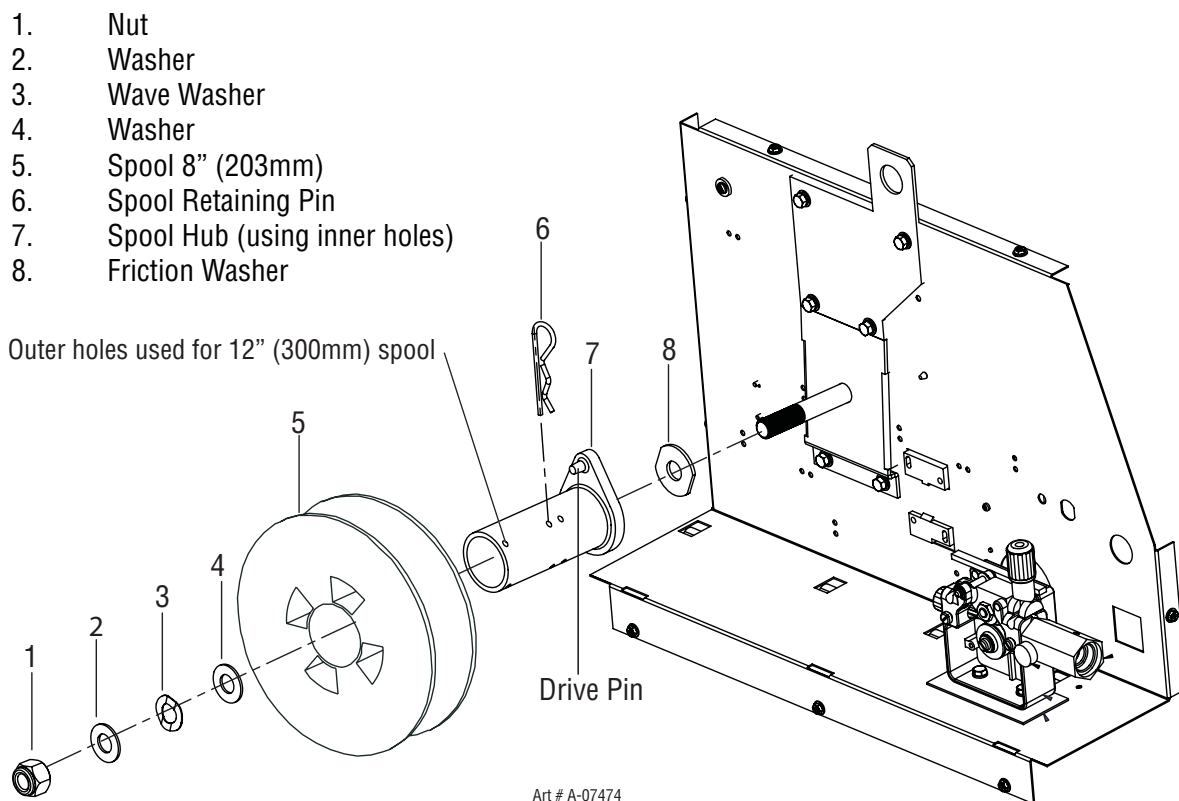


Figure 3-7: Spool Installation

FABRICATOR 190 WELDING MACHINE

3.10 Inserting Wire into the Feedhead and Welding Gun



WARNING

ELECTRIC SHOCK CAN KILL! Make certain the machine is unplugged from the power receptacle. Do not plug machine in until told to do so in these instructions

Slide the wire spool onto the hub, loading it so that the wire will feed off the spool as the spool rotates counter clockwise.

Make sure the drive pin on the spool hub lines up with the hole in the spool.

When the spool of wire is in place, replace the spool retaining pin.

NOTE

The Hub tension has been pre-adjusted at the factory. However is adjustment is required, simply turn the spool nut counter clockwise to reduce tension, and clockwise to increase tension

CAUTION

Use care in handling the spooled wire as it will tend to “unravel” when loosened from the spool. Grasp the end of the wire firmly, and don’t let go of it. Make sure the end of the wire is free of any burrs and is straight.

1. Loosen Pressure Adjust Device knob (Fig. 3-8)
2. Open Pressure Adjust Device (Fig. 3-9)
3. Open Pressure Arm (Fig. 3-9)
4. Place end of wire into the Inlet Wire Guide, feeding it over the Feedroll. Make certain the proper groove is being used. (Fig. 3-10)
5. Pass the wire into the outlet guide then into the MIG Gun. (Fig. 3-10)
6. Close the Pressure Arm. (Fig. 3-9)
7. Close the Pressure Adjust Device. Tighten the Pressure Adjust Device knob to a “snug” condition. (Fig. 3-9)
8. Figure 3-10 shows the result with wire installed.

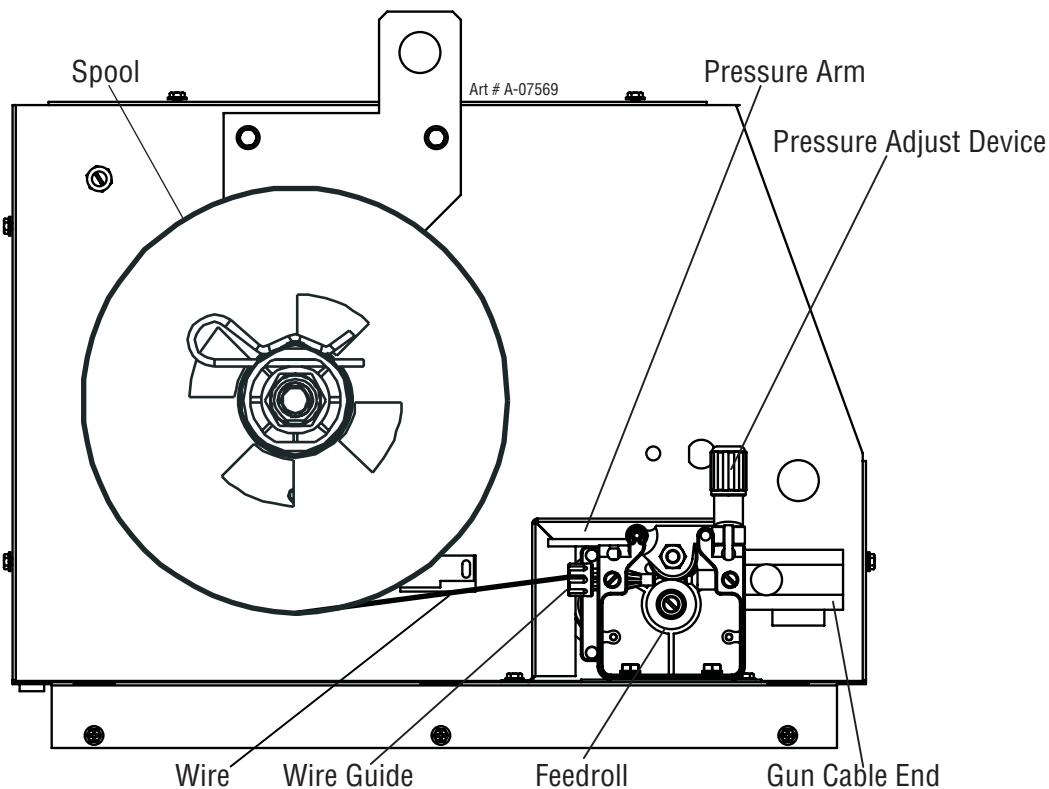


Figure 3-8: Inner Workings of Device

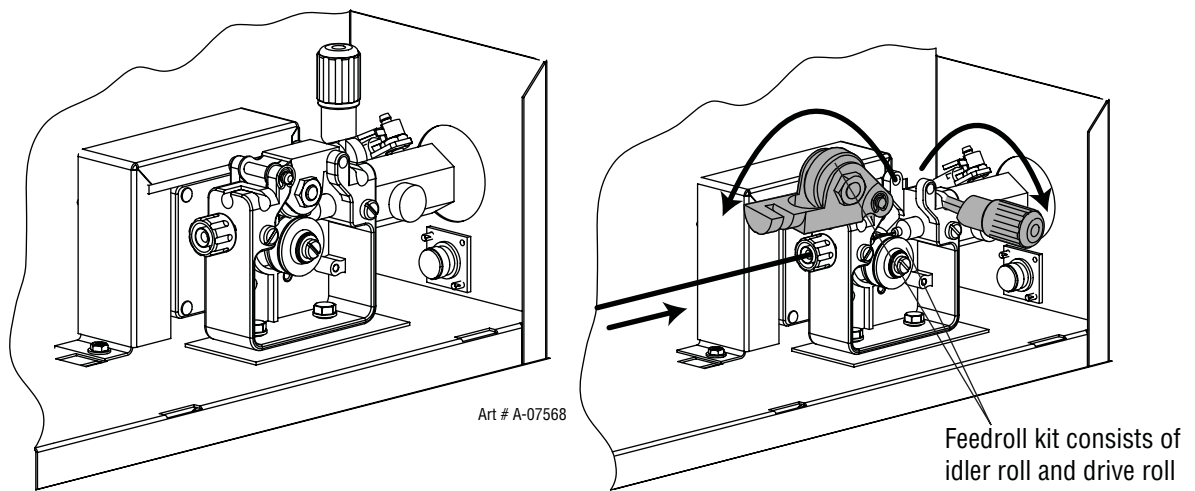


Figure 3-9: Opening Pressure Arm and Inserting Wire

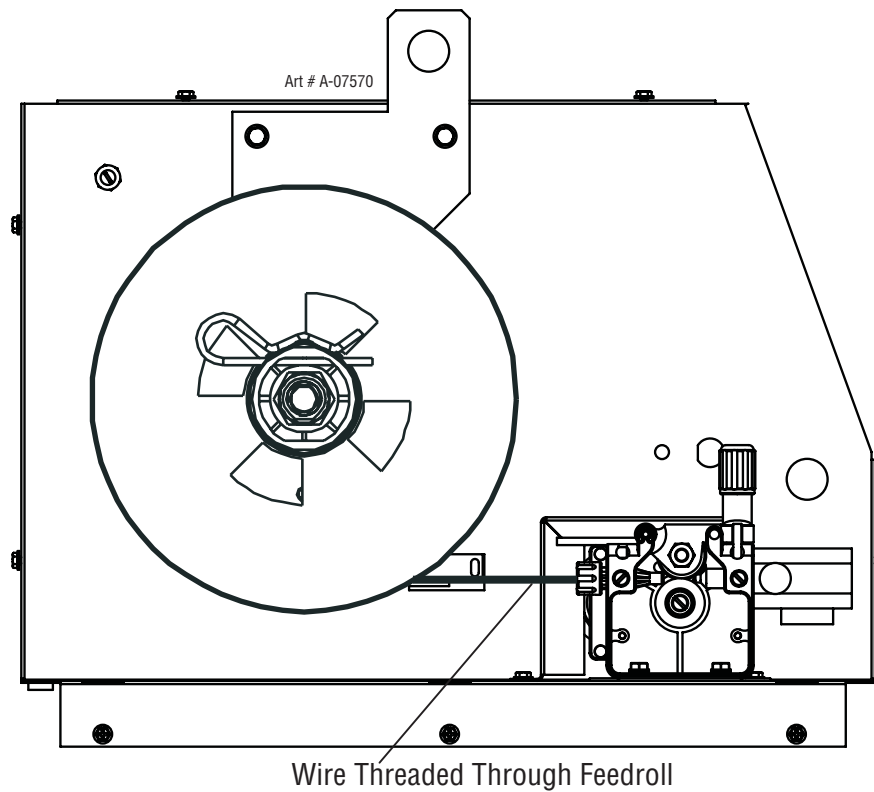


Figure 3-10: Wire Installed

FABRICATOR 190 WELDING MACHINE

3.11 Polarity Changeover



WARNING

ELECTRIC SHOCK CAN KILL! Make certain the machine is unplugged from the power receptacle. Do not plug machine in until told to do so in these instructions

As delivered from the factory, the output polarity is connected for DCEP (reverse polarity).

PROCESS	POLARITY	CABLE CONNECTIONS	
		CABLE TO GUN	CABLE TO WORK
1. GMAW* – Steel, Stainless Steel, Aluminum & gas shielded Flux Cored electrode wires	1. D.C. Electrode Positive (DCEP) – Reverse Polarity	1. Connected to (+) Pos. output terminal	1. Connected to (-) Neg. output terminal
2. FCAW* – Gasless Flux Cored electrode wire	2. D.C. Electrode Negative (DCEN) – Straight Polarity	2. Connected to (-) Neg. output terminal	2. Connected to (+) Pos. output terminal
* Exception: Contact your filler metal supplier for the recommended polarity.			

Table 3-4: Process Cable Connections

Changing polarity process.

- Locate the two terminal knobs at the bottom of the machine. Refer to Figure 3-11.
- Remove both terminal knobs by rotating counter-clockwise. Refer to Figure 3-11.
- Set up the desired lead polarity as per Table 3-4 and as shown in Figure 3-12 by placing the loose end of the polarity cable on the appropriate terminal.
- Connect (or re-connect) the work cable to the vacant terminal
- Replace both terminal knobs.

NOTE

Ensure terminal knobs are tightly secured and that there is no connection between positive and negative terminals.

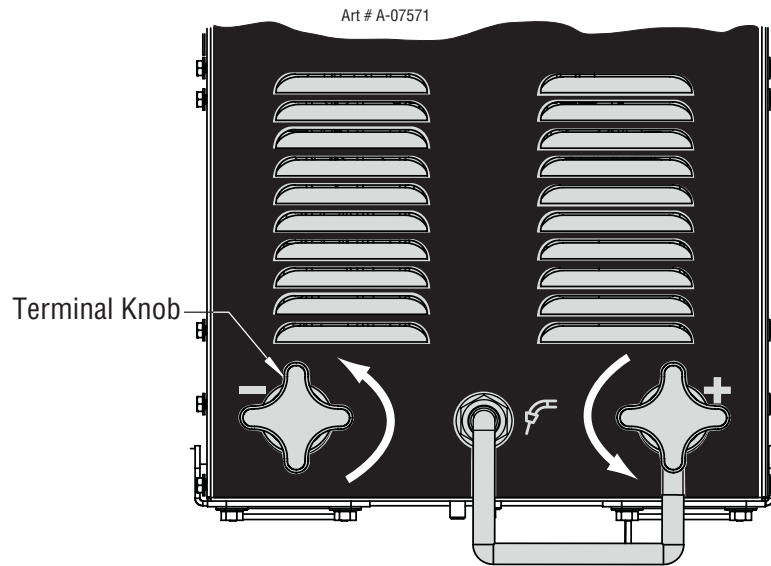


Figure 3-11: Remove Terminal Knobs

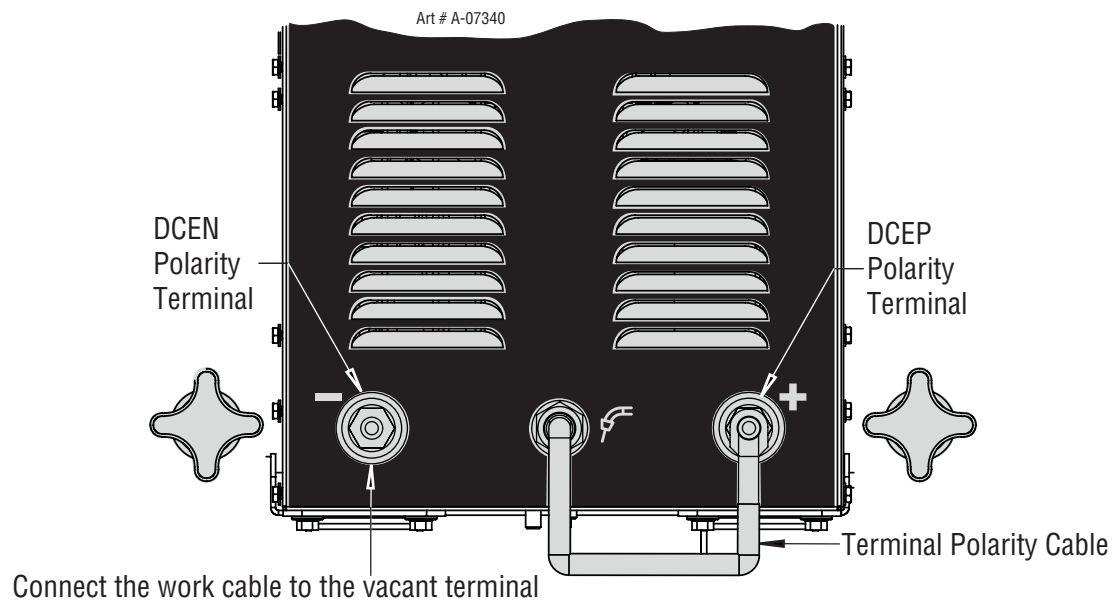


Figure 3-12: Terminal Polarity Setting

SECTION 4: OPERATION



WARNING

The electrode wire will be at welding voltage potential while it is being fed through the system.

4.01 Inside Panel

1. **Burnback Control Knob:** Burnback time is the difference between the wirefeed motor stopping and switching off of the welding current. The Burnback time allows the electrode wire to burn out of the molten metal weld pool. The Burnback time is factory set for optimum performance. Turn the Burnback knob clockwise to increase the time and counter-clockwise to decrease it. The adjustable range is 0 to .6 seconds. Refer to Figure 4-1.
2. **Wirefeeder Drive Roller Pressure Adjustment:** The idler roll applies pressure to the drive roll via screw adjustable spring pressure. The pressure adjust device should be adjusted to a minimum pressure that will provide satisfactory wire feed without slippage. If slipping occurs, and inspection of the wire contact tip reveals no wear, distortion or burn-back jam, the conduit liner should be checked for kinks and clogging by metal flakes and slag. If this is not the cause of slipping, the feedroll pressure can be increased by rotating the pressure adjust device clockwise. The use of excessive pressure may cause rapid wear of the feed roll, motor shaft and motor bearings.
3. **Wire Reel Brake:** The spool hub incorporates a friction brake which is adjusted during manufacture for optimum braking. If it is considered necessary, adjustment can be made by turning the large nut inside the open end of the spool hub. Clockwise rotation will tighten the brake. Correct adjustment will result in the spool circumference continuing no further than $\frac{3}{4}$ " (20mm) after release of the Gun trigger switch. The wire should be slack without becoming dislodged from the spool.



CAUTION

Excessive tension on the brake will cause rapid wear of mechanical wire feed parts, overheating of electrical components and possibly an increased incidence of wire Burnback into the contact tip.

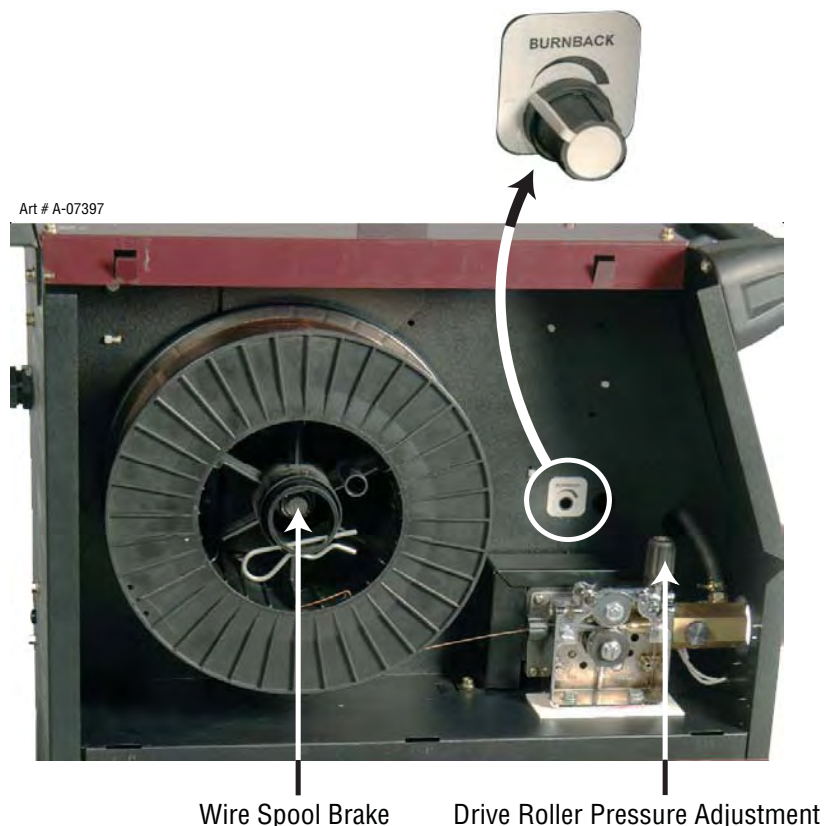
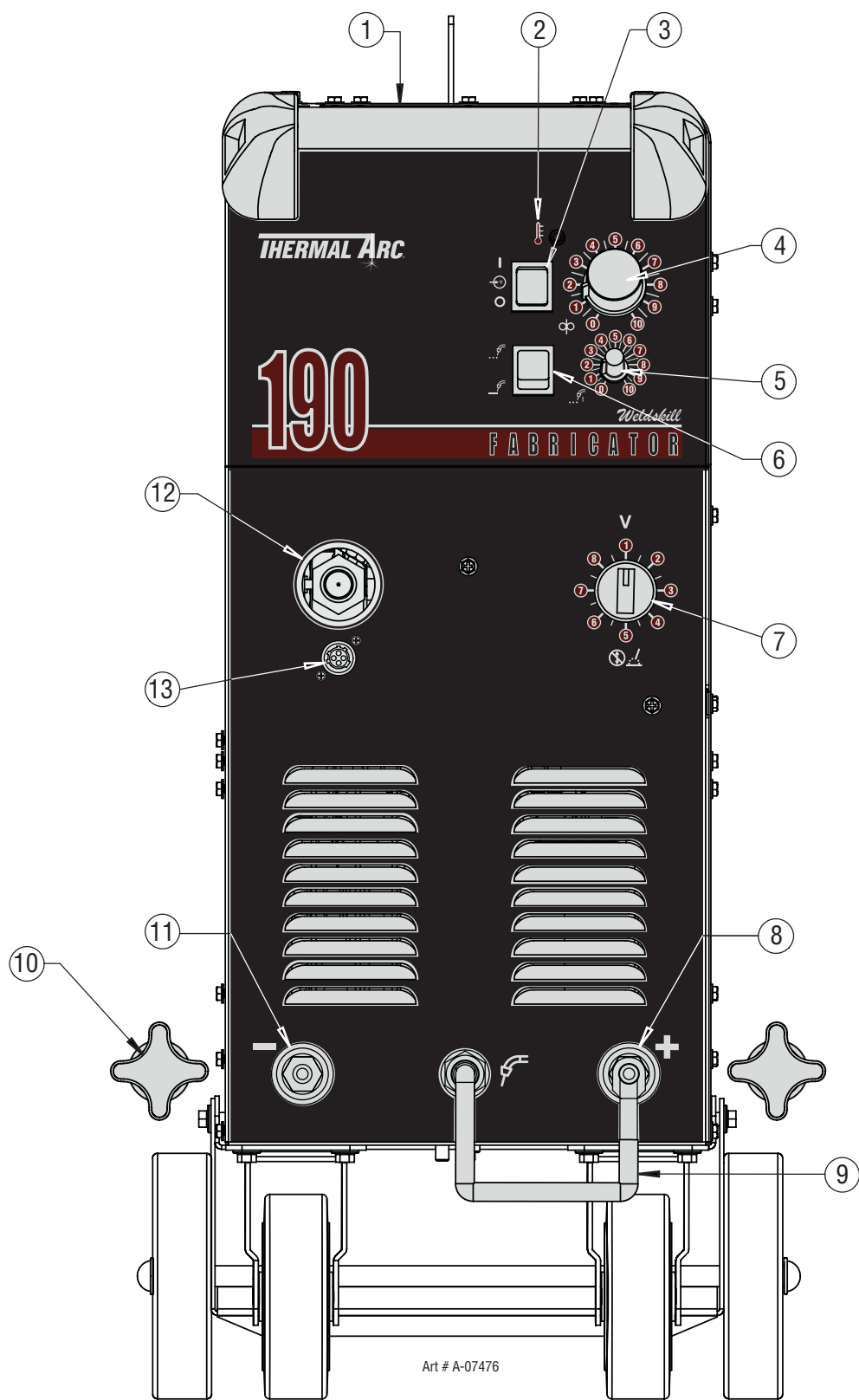


Figure 4-1: Inside Panel

FABRICATOR 190 WELDING MACHINE

4.02 Power Supply Front Panel



Art # A-07476

Figure 4-2: Fabricator 190 Front Panel

1. Handle Bar

- 2. Thermal Overload Indicator:** The critical component for thermal protection are the rectifier stack and the transformer, which are fitted with thermal overload protection devices. If the overload is activated then the machine should be left to cool for approximately 15 minutes before resuming welding. If the Power Source is operated within its duty cycle, the thermal overload will not activate. Refer to section 2.10 for an explanation of duty cycle and section 2.13 for the power supply specifications.



WARNING

When the On/Off Power Switch Indicator is lit, the machine is connected to the primary input supply voltage and the internal electrical components are at primary input voltage potential.

- 3. On/Off Power Switch:** The indicator light is provided to indicate when the Fabricator 190 is connected to the Input Power Supply Voltage. With the switch in the Off position  the auxiliary power and the fan are turned off and the switch is illuminated to indicate that the primary power is still present.
- 4. Wirespeed Control:** The Wirespeed Control knob controls the wire feed speed which is adjustable from 80 to 800 IPM.
- 5. Spot Timer Control:** The spot time duration is set by the Spot Timer Control knob, and is only activated with the mode selector switched to Spot position. When the Mode Selector switch is switched to the Spot position, the Spot Timer Control knob controls the duration of a single spot weld. The timer is adjustable from .5 to 4.5 seconds.
- 6. Mode Selector Switch:** The Mode Selector switch selects the method of welding.



CONTINUOUS: This mode of welding is used to weld two or more components together with a continuous weld. When the MIG gun trigger switch is depressed welding commences. When the MIG gun trigger switch is released welding ceases.



SPOT: This mode of welding is used to weld two plates together at a desired location by melting the top & bottom plates together to form a nugget between them. The spot time period is set by the Spot Timer Control knob.

- 7. Output Voltage Control Switch:** The Output Voltage Control Switch sets the voltage level to the welding terminals. The output voltage is increased when the switch is rotated in the clockwise direction.



CAUTION

The Output Voltage Control switch MUST NOT BE SWITCHED during the welding process.

- 8. Positive Welding Current Terminal:** Welding current flows from the Power Supply via this heavy duty terminal. Shown with terminal knob removed. The knob must be firmly secured before attempting to weld.
- 9. Gun Polarity Lead:** This lead selects the welding voltage polarity of the electrode wire. Attach it to the positive welding terminal (+) when using steel, stainless steel or aluminum electrode wire. Attach the Gun Polarity Lead to the negative welding terminal (-) when using gasless flux cored electrode wire. If in doubt, consult the manufacturer of the electrode wire for the correct polarity.
- 10. Positive and Negative Welding Terminal Knobs** Welding current flows from the Power Supply via the heavy duty terminals. The knobs must be firmly secured before attempting to weld.

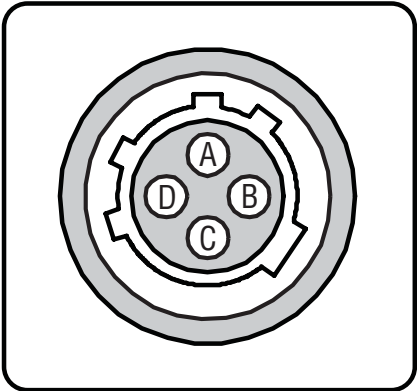


CAUTION

Loose welding terminal connections can cause overheating and result in failure of the terminals.

- 11. Negative Welding Current Terminal:** Welding current flows from the Power Supply via this heavy duty terminal. Shown with terminal knob removed. The knob must be firmly secured before attempting to weld.
- 12. Gun Connector:** This is the receptacle into which the MIG gun is connected. It accepts a #4 Tweco style gun.
- 13. Gun Trigger Switch Amphenol Receptacle:** The Gun Trigger 4-pin receptacle is used to connect the two wires from the MIG gun to the Fabricator 190. Only pins A and B are used for this. To make connections, align keyway, insert plug, and rotate threaded collar fully clockwise. Refer to Figure 4-3.

13.Torch Trigger Receptacle (continued)



Socket Pin	Function
A	Gun Switch
B	Gun Switch (contact closure provided between pins A and B to energize the contactor).
C	Not Used
D	Not Used

Figure 4-3: Torch Trigger Receptacle Pin-out

4.03 TWECO Weldskill MIG Gun

The TWECO Weldskill MIG Gun fitted to the FABRICATOR 190 offers robust construction, unparalleled reliability and easy replacement of consumable parts. The TWECO Weldskill MIG Gun has an operating capacity in excess of the capacity of the FABRICATOR and can be expected to give trouble free service.

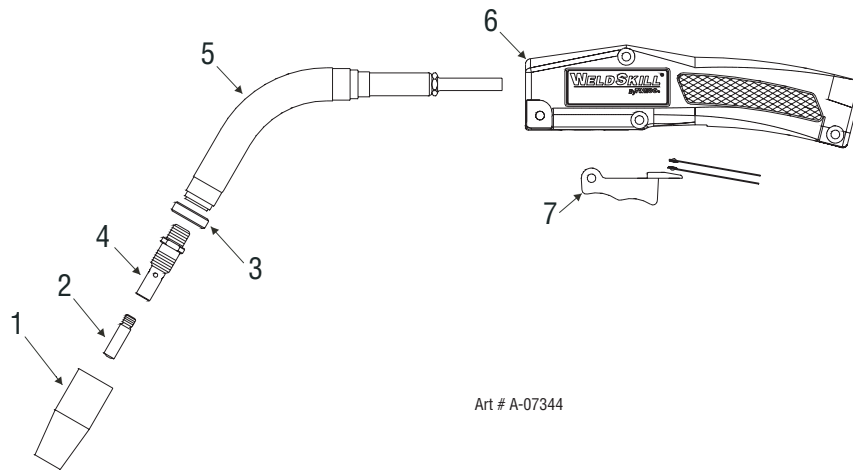


Figure 4-4: TWECO Weldskill MIG Gun

1. NOZZLE
2. CONTACT TIP
3. INSULATOR
4. DIFFUSER
5. CONDUCTOR TUBE
6. HANDLE ASSY
7. SWITCH ASSY

TWECO MIG guns may be fitted to many different types of MIG welding Power Supplies so that your whole shop can be converted to TWECO. Not only will this give greater reliability (and hence greater productivity) but it will reduce stockholding of consumable parts.

Contact your Thermal Arc distributor to order TWECO replacement parts, options and accessories. For assistance in locating a Thermal Arc distributor, contact the Thermadyne office listed in the inside rear cover that is nearest to you.

4.04 Gun Consumable Parts

Refer to the appendix section of this manual for the list of consumable items, including nozzels, contact tips, gas diffusers and conductor tubes.

FABRICATOR 190 WELDING MACHINE

4.05 Installing A New Wire Conduit Liner

Removal

1. Be sure the MIG gun cable is arranged in a straight line, free from twists, when installing or removing a wire conduit.
2. Unscrew and remove the MIG gun nozzle and contact tip.
3. Loosen the Allen screw in the gas diffuser and unscrew it from the conductor tube.
4. Loosen the Allen screw in the connector plug and pull the old wire conduit out of the cable assembly from the connector plug end.

Installation

1. Inspect the two O-ring gas seals on the connector plug for cuts or damage.
2. Start from the connector plug end of the assembly and begin pushing the conduit through the connector plug, cable assembly and into the gun. If the conduit should lodge along the way, gently whip or work the cable assembly to aid forward movement.
3. When the wire conduit stop meets the end of the connector plug and the new raw end extends through the end of the conductor tube on the welding gun, the

Allen screw in the connector plug must be securely tightened onto the conduit to prevent its backward movement.

NOTE

When the conduit is fully inserted into the cable assembly and the conduit stop is firmly against the Connector Plug, the “raw end” of the conduit will protrude out of the open end of the gun conductor tube. Trim the conduit as shown in Figure 4-5. The trimmed end which seats in the Gas Diffuser must be filed and reamed smooth on the inside and outside radii so wire feed will not be obstructed.

3. Replace the Gas Diffuser and tighten its Allen screw against the conduit.
4. Replace the Contact Tip and Nozzle.



CAUTION

Do not over tighten the Allen screws as this will distort the conduit and lead to wire feedability problems.

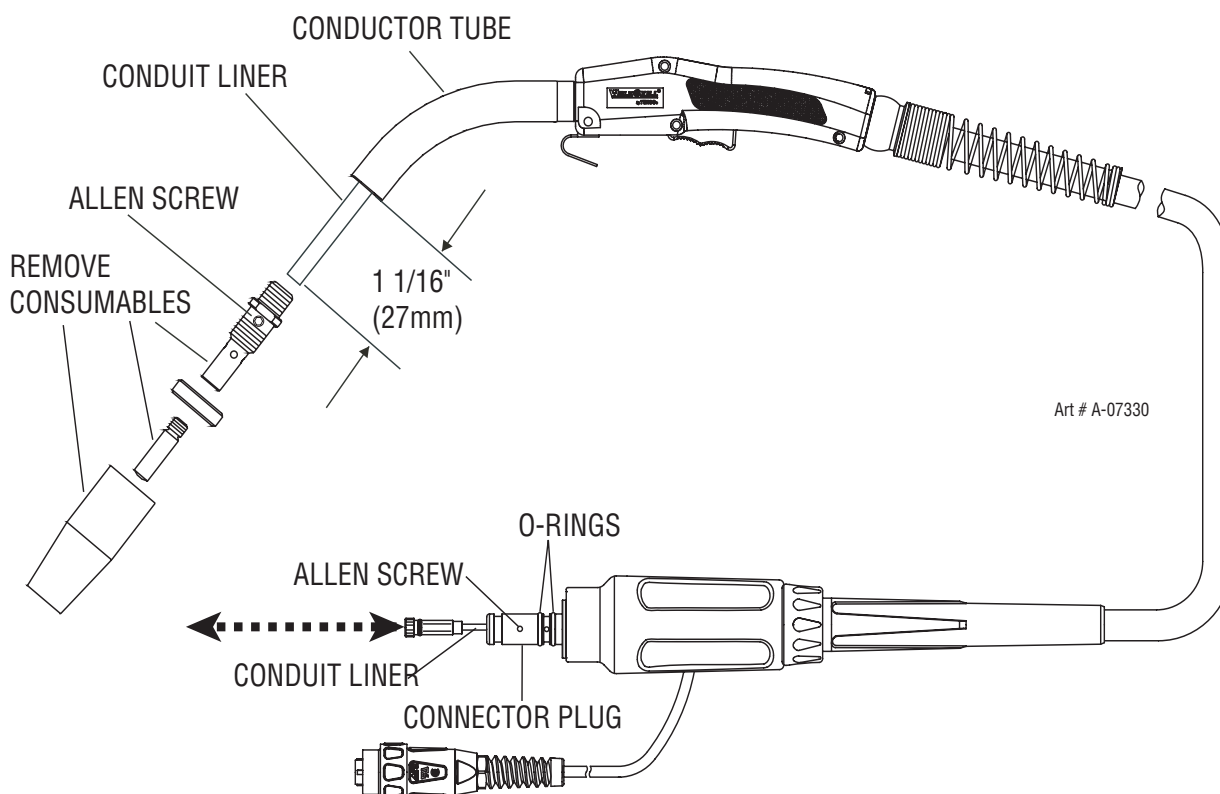


Figure 4-5: Conduit Installation and Trim Length

4.06 MIG Gun Maintenance

Remove dust and metallic particles from the gun conduit by forcing clean, dry compressed air into the conduit once a week. This will minimize wire feeding problems.

4.07 Basic Welding Technique

Setting of the Power Supply

The setting of the Fabricator requires some practice by the operator, the welding Power Supply having two control settings that have to balance. These are the Wire Speed control and the Voltage Control switches. The welding current is determined by the Wire Speed control, the current will increase with increased Wire Speed, resulting in a shorter arc. Less wire speed will reduce the current and lengthen the arc. Increasing the welding voltage hardly alters the welding current level, but lengthens the arc. By decreasing the voltage, a shorter arc is obtained with little change in welding current.

When changing to a different electrode wire diameter, different control settings are required. A thinner electrode wire needs more Wire Speed to achieve the same current level.

A satisfactory weld cannot be obtained if the wire speed and voltage switch settings are not adjusted to suit the electrode wire diameter and dimensions of the work piece.

If the Wire Speed is too high for the welding voltage, “stubbing” will occur as the wire dips into the molten pool and does not melt. Welding in these conditions normally produces a poor weld due to lack of fusion. If, however, the welding voltage is too high, large drops will form on the end of the electrode wire, causing spatter. The correct setting of voltage and Wire Speed can be seen in the shape of the weld deposit and heard by a smooth regular arc sound.

Travel Speed

Speed at which a weld travels influences the width of the weld and penetration of the welding run.

Position of MIG gun

The angle of MIG gun to the weld has an effect on the width of the weld run. Refer to Figure 4-6.

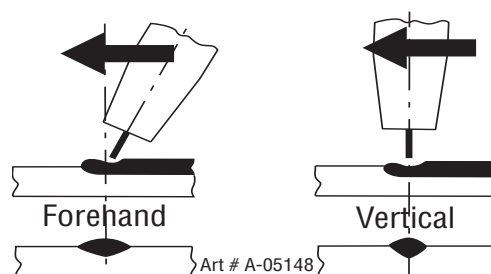


Figure 4-6: MIG Gun Angle

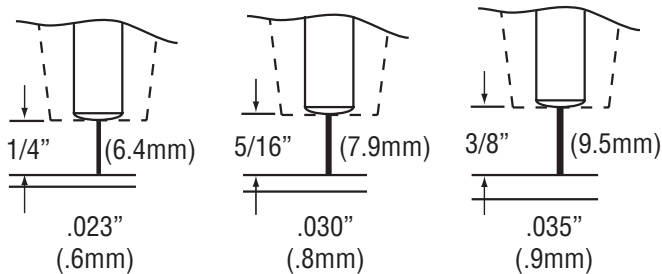
FABRICATOR 190 WELDING MACHINE

Distance from the MIG Gun Nozzle to the Work Piece

The electrode stick out from the MIG gun nozzle should be between 5/64" (2.0mm) to 13/64" (5.0mm). This distance may vary depending on the type of joint that is being welded.

Art # A-07186

Solid Wire



Flux Cored Wire

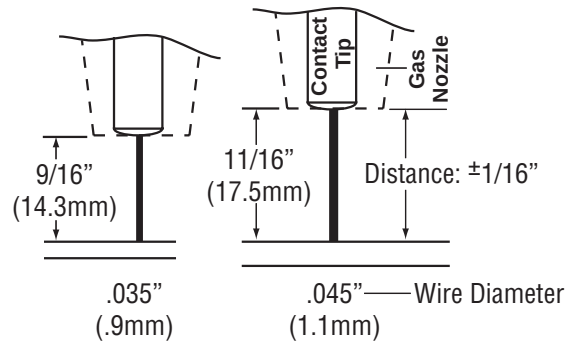


Figure 4-9: Optimum Contact Tip to Work Distances

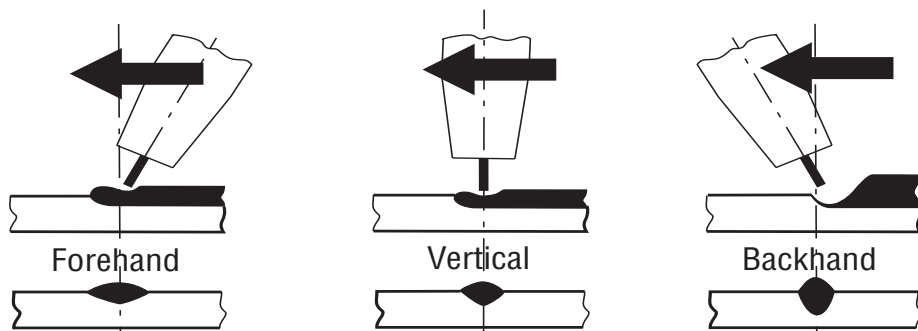
Electrode Wire Size Selection

The choice of electrode wire size in conjunction with shielding gas used depends on:

- Thickness of the metal to be welded,
- Type of joint,
- Capacity of the wire feed unit and power supply,
- The amount of penetration required,
- The deposition rate required,
- The bead profile desired,
- The position of welding and
- Cost of the electrode wire.

Advantages of MIG welding forehand:

- Allows superior visibility of the weld zone
- Flatter weld bead
- Shallower penetration



Art # A-07185

Figure 4-7: Advantages of forehand welding

4.08 Technical Tips

Reduce Porosity in the Weld Metal

- Weld in still air to ensure gas coverage
- Clean the dirty, oil, paint, oxidization or grease from the metal to be welded
- Eliminate any gas leaks in the hose
- Make sure the gas cylinder is not empty with a flow rate of about 25cfh

Electrode Wire Burns Back to the Contact Tip

- Wire feed speed is too low
- MIG gun liner is blocked with dust or metallic dust
- Bent MIG gun liner
- Damage or worn inlet or outlet wire guides in the wire drive system

Irregular Weld Beard Shape

- Incorrect or worn feed roller size
- Incorrect size or worn contact tip
- Bad work lead contact to work piece

No Strength in the Weld Joint

- Wire feed speed (welding current) is too low
- Incorrect gas for the material being welded
- Joint preparation too narrow or gap too tight

Cracks Develop in the Weld Metal

- Arc voltage is too high
- The weld cooling rate is too fast
- The stresses in the welded metal are too high
- Weld penetration is too narrow and deep

FABRICATOR 190 WELDING MACHINE

4.09 Spot Welding Operation

Fit an optional spot welding nozzle to the MIG gun for consistent spot welding operations. Refer to Figure 4-8 and the Spot Welding Nozzles table below. The Fabricator will operate effectively using .030" (0.8mm) electrode wire when spot welding. Penetration depth is limited when using .023" (0.6mm) electrode wire for spot welding. Set the controls as follows for maximum penetration when spot welding:

Output Voltage Control Switch to 8

Wirespeed Control to between 5 to 8

Mode Selector Switch to  Spot

Adjust the Spot Time control knob for the desired weld penetration

Voltage Selector Switches and Wirespeed Control

Select higher Voltage Selector switch positions and set the Wirespeed Control between 354 to 590 ipm (9 to 15 meters/minute) for maximum penetration.

Mode Selector Switch

Set the MODE SELECTOR switch to SPOT.

Spot Time

Adjust the SPOT TIME control shaft for the desired weld or 'ON' time for spot welding.



21-62-FAS

Art # A-07675

Figure 4-8: Spot Welding Nozzles

SPOT WELDING NOZZLES	
TYPE	MINI & NO. 1 150 AMP
Flat Arc Spot	21-62-FAS 1210-1520 (5/8" Bore)
Inside Corner Arc Spot	N/A
Outside Corner Arc Spot	N/A
Automotive Stud Nozzle	21-62 SAS 1210-1524

4.10 Gas Selection for Gas Metal Arc Welding

Metal Type	Base Plate Thickness	Filler Metal	Transfer Mode	Suggested Shielding Gas	Welding Positions	Comments
Carbon Steel	Greater than 22 gauge (.030")	ER70S-X	Short Circuit	100% CO ₂	All Position Welding	High welding speeds. Good penetration and pool control.
	Greater than 22 gauge (.030")	ER70S-X	Short Circuit	75% Argon 25% CO ₂	All Position Welding	Suitable for high-current and high-speed welding.
	Greater than 22 gauge (.030")	ER70S-X	Short Circuit	92% Argon 8% CO ₂	All Position Welding	Higher deposition rates without melt-through. Minimum distortion and spatter. Good pool control for out-of-position welding.
	Greater than 10 gauge (? ")	ER70S-X	Spray Transfer	92% Argon 8% CO ₂	Flat & HV Fillet	Good arc stability, weld soundness, and increasing width of fusion.
Low Alloy and High Alloy Steel	Greater than 22 gauge (.030")	See Note 1	Short Circuit Globular	75% Argon 25% CO ₂	All Position Welding	High welding speeds. Good penetration and pool control. Applicable for out-of-position welds. Suitable for high-current and high-speed welding.
	Greater than 22 gauge (.030")	See Note 1	Short Circuit	92% Argon 8% CO ₂	All Position Welding	Good coalescence and bead contour. Good mechanical properties.
	Greater than 3/32"	See Note 1	Spray transfer	92% Argon 8% CO ₂ minimum 80% Argon 20% O ₂	Flat & HV Fillet	Reduces undercutting. Higher deposition rates and improved bead wetting. Deep penetration and good mechanical properties.
	Greater than 14 gauge (.075")	See Note 1	Short Circuit	98% Argon 2% CO ₂	All Position Welding	Good control of melt-through and distortion. Used also for spray arc welding. Pool fluidity sometimes sluggish depending on the base alloy.
Stainless Steel	Greater than 22 gauge (.030")	ER308-X ER309-X ER316-X	Short Circuit	90% Helium 7.5% Argon 2.5% CO ₂ or 81% Argon 18% Helium 1 % CO ₂	All Position Welding	Low CO ₂ percentages in Helium mix minimizes carbon pickup, which can cause intergranular corrosion with some alloys. Helium improves wetting action and contour. CO ₂ percentages above 5% should be used with caution on some alloys.
	Greater than 3/32"	ER308-X ER309-X ER316-X	Spray Transfer	90% Helium 7.5% Argon 2.5% CO ₂ or 81% Argon 18% Helium 1 % CO ₂	Flat & HV Fillet	Good arc stability. Produces a fluid but controllable weld pool, good coalescence, and bead contour. Minimizes undercutting on heavier thickness.
Aluminum	Greater than 18 gauge (.045")	ER4043 ER5356	Spray Transfer	Argon	All Position Welding	Excellent cleaning action. Provides more stable arc than helium-rich mixtures.

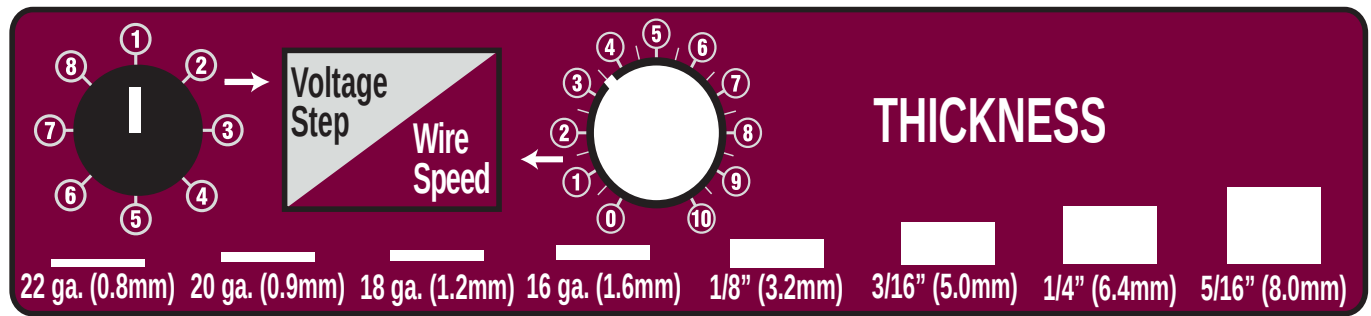
Note 1: Contact your Filler Metal Supplier for recommended filler metal for the base metal to be welded.

FABRICATOR 190 WELDING MACHINE

4.11 Welding Setting Selection Guide

Material Type	Wire Type	Shielding Gas and Flow Rate	Wire Size (Diameter)
Steel	Solid (or hard) ER70S-6	100% CO ₂ 25cfh	.023" (0.6mm)
			.030" (0.8mm)
			.035" (0.9mm)
		75% Ar 25% CO ₂ 25cfh	.023" (0.6mm)
			.030" (0.8mm)
			.035" (0.9mm)
		92% Ar 8% CO ₂ 25cfh	.023" (0.6mm)
			.030" (0.8mm)
			.035" (0.9mm)
Steel	Flux Core E71 T-11 E71 T-GS	None Required	.030" (0.8mm)
			.035" (0.9mm)
Aluminum	Aluminum 4043 ER 5183 ER 5356 ER	100% Ar 25cfh	.030" (0.8mm)
			.035" (0.9mm)
Stainless Steel	Stainless Steel ER 308 ER 308L ER 308LSi	90% He 7.5% Ar 2.5 CO ₂ 35cfh	.023" (0.6mm)
			.030" (0.8mm)
			.035" (0.9mm)

Art # A-07448



—	3	3	4	—	—	—	—
—	2	3	3	4	—	—	—
—	—	3	3	4	—	—	—
1	1	2	2	3	4	6	—
1	2	2	3	4	4	5	6
—	—	2	3	4	5	6	6
1	1	2	2	7	—	—	—
1	2	2	3	7	7	8	8
—	—	2	3	7	7	8	8
—	—	1	1	4	5	5	7
—	—	—	2	4	5	6	6
—	—	1	1	2	4	6	—
—	—	—	1	3	5	6	7
2	2	3	4	4	5	—	—
2	2	3	4	5	6	7	—
—	—	3	3	4	5	6	—

NOTES

SECTION 5: MAINTENANCE

5.01 Routine Maintenance & Inspection

The only routine maintenance required for the Fabricator is a thorough cleaning and inspection, with the frequency depending on the usage and the operating environment.



WARNING

Disconnect the Fabricator from the Input power supply voltage before disassembling.

Special maintenance is not necessary for the control unit parts in the Power Supply. If these parts are damaged for any reason, replacement is recommended.



CAUTION

Do not blow air into the Power Supply during cleaning. Blowing air into the Power Supply can cause metal particles to interfere with sensitive electronic components and cause damage to the Power Supply.

To clean the Power Supply, disconnect it from the mains supply voltage then open the enclosure and use a vacuum cleaner to remove any accumulated dirt and dust. The Power Supply should also be wiped clean. If necessary, solvents that are recommended for cleaning electrical apparatus may be used.

Troubleshooting and repairing the Fabricator should be carried out only by those who are familiar with electrical equipment.



WARNING

Do not attempt to diagnose or repair unless you have had training in electronic measurement and troubleshooting techniques.



Warning!
Disconnect input power before maintaining.

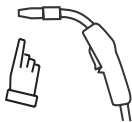
Maintain more often
if used under severe
conditions

Each Use

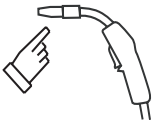
Visual check of
regulator and pressure



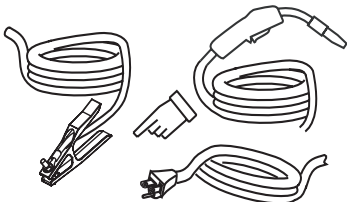
Visual check of torch
Consumable parts



Weekly



Visually inspect the torch
body and consumables



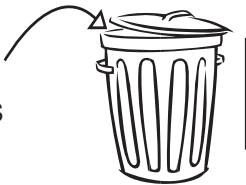
Visually inspect the
cables and leads.
Replace as needed



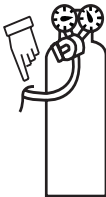
Visually inspect the Wire
feed mechanisms

3 Months

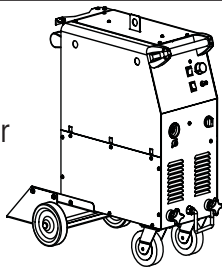
Replace all
broken parts



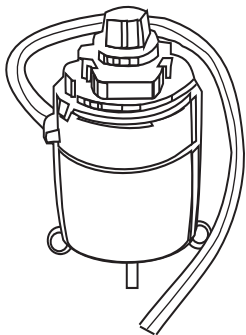
Gas and
air lines



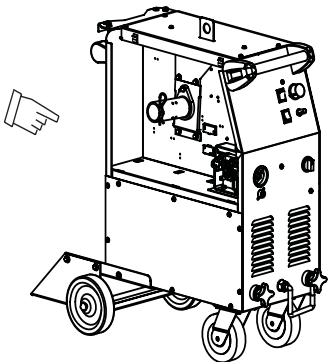
Clean exterior
of power
supply



6 Months



Visually check and
use a vacuum to carefully
clean the interior



Art # A-07362

SECTION 6: TROUBLESHOOTING

6.01 Basic Troubleshooting

The basic level of troubleshooting is that which can be performed without special equipment or knowledge, and without removing the covers from the Power Supply.

If major components are faulty, then the Power Supply should be returned to an Accredited Thermal Arc Service Agent for repair.

6.02 Solving Problems Beyond the Welding Terminals

The general approach to fix Gas Metal Arc Welding (GMAW) problems is to start at the wire spool then work through to the MIG torch. There are two main areas where problems occur with GMAW:

1. Porosity

When there is a gas problem the result is usually porosity within the weld metal. Porosity always stems from some contaminant within the molten weld pool which is in the process of escaping during solidification of the molten metal.

Contaminants range from no gas around the welding arc to dirt on the work piece surface. Porosity can be reduced by checking the following points:

1. *Gas cylinder contents and flow meter.*
 - a. Ensure that the gas cylinder is not empty and the flow meter is correctly adjusted to 20-40 CFM.
2. *Gas leaks*
 - a. Check for gas leaks between the regulator/cylinder connection and in the gas hose to the Power Source.
3. *Internal gas hose in the Power Source.*
 - a. Ensure the hose from the solenoid valve to the MIG torch adaptor has not fractured and that it is connected to the MIG torch adaptor.
4. *Welding in a windy environment.*
 - a. Shield the weld area from the wind or increase the gas flow.

5. *Welding dirty, oily, painted, oxidized or greasy plate.*
 - a. Clean contaminates off the plate
6. *Distance between the MIG torch nozzle and the work piece.*
 - a. Keep the distance between the MIG torch nozzle and the work piece to a minimum.
7. *Maintain the MIG torch in good working order.*
 - a. Ensure that the gas holes are not blocked and gas is exiting out of the torch nozzle. Refer to WARNING below
 - b. Do not restrict gas flow by allowing spatter to build up inside the MIG torch nozzle.
 - c. Check that the MIG gun O-rings are not damaged.



WARNING

Disengage the drive roll when testing for gas flow by ear.

2. Inconsistent wire feed

Wire feeding problems can be reduced by checking the following points:

1. *Wire spool brake is too tight.*
 - a. Feed roller driven by motor in the cabinet will slip.
2. *Wire spool brake is too loose.*
 - a. Wire spool can unwind and tangle.
3. *Worn or incorrect feed roller size.*
 - a. Use 'U' groove drive feed roller matched to the aluminum wire size you are welding. Use 'V' groove drive feed roller matched to the steel wire size you are welding. Use 'knurled V' groove drive feed roller matched to the flux cored wire size you are welding.

4. *Misalignment of inlet/outlet guides.*
 - a. Wire will rub against the misaligned guides and reduces wire feedability.
5. *Liner blocked with slag.*
 - a. Slag is produced by the wire passing through the feed roll, if excessive pressure is applied to the pressure adjustment device. Slag can also be produced by the wire passing through an incorrect feed roll groove shape or size. Slag is fed into the conduit where it accumulates thus reducing wire feedability.
6. *Incorrect or worn contact tip.*
 - a. The contact tip transfers the weld current to the electrode wire. If the hole in the contact tip is too large then arcing may occur inside the contact tip resulting in the electrode wire jamming in the contact tip. When using soft electrode wire such as aluminum it may become jammed in the contact tip due to expansion of the wire when heated. A contact tip designed for soft electrode wires should be used.
7. *Poor work lead contact to work piece.*
 - a. If the work lead has a poor electrical contact to the work piece then the connection point will heat up and result in a reduction of power at the arc.
8. *Bent conduit.*
 - a. This will cause friction between the wire and the conduit thus reducing wire feedability.

6.03 Welding Problems

FAULT	CAUSE	REMEDY
A. Undercut	1. Welding arc voltage too high.	a. Reduce voltage by reducing the output voltage control switch position or increase the wire speed.
	2. Incorrect torch angle	a. Adjust angle (Refer to Section 4.07)
	3. Excessive heat input	a. Increase the torch travel speed and/or reduce welding current by reducing the output voltage control switch position or reducing the wire speed.
	4. Weld speed too fast	a. Reduce weld speed.
B. Lack of penetration	1. Welding current too low	a. Increase welding current by increasing wire speed and increasing voltage selection switch position.
	2. Joint preparation too narrow or gap too tight	a. Increase joint angle or gap
	3. Shielding gas incorrect	a. Change to a gas which gives higher penetration
	4. Weld speed too fast	a. Reduce weld speed.
C. Lack of fusion	1. Voltage too low	a. Increase voltage by increasing output voltage control switch position.
	2. Weld speed too fast	a. Reduce weld speed.
D. Excessive spatter	1. Voltage too high	a. Lower voltage by reducing the output voltage control switch or increase wire speed control.
	2. Voltage too low	a. Raise voltage by increasing the output voltage control switch or reduce wire speed control.
	3. Weld speed too fast	a. Reduce weld speed.
E. Irregular weld shape	1. Incorrect voltage and current settings. Convex, voltage too low. Concave, voltage too high.	a. Adjust voltage and current by adjusting the output voltage control switch and the wire speed control.
	2. Wire is wandering	a. Replace contact tip
	3. Incorrect shielding gas	a. Check shielding gas.
	4. Insufficient or excessive heat input	a. Adjust the wire speed control or the output voltage control switch.
	5. Weld speed too fast	a. Reduce weld speed.

Table 6-1a: Welding Problems and Solutions

FAULT	CAUSE	REMEDY
F. Weld cracking	1. Weld beads are too small	a. Decrease travel speed
	2. Weld penetration narrow and deep	a. Reduce current and voltage and increase Mig torch travel speed or select a lower penetration shielding gas.
	3. Excessive weld stresses	a. Increase weld metal strength or revise design
	4. Excessive voltage	a. Decrease voltage by reducing the voltage selection switch.
	5. Cooling rate too fast	a. Slow the cooling rate by preheating part to be welded or cool slowly.
	6. Weld speed too fast	a. Reduce weld speed.
G. Cold weld puddle.	1. Faulty rectifier unit	a. Have an Accredited THERMAL ARC Service Agent to test then replace the faulty component.
	2. Loose welding cable connection.	a. Check all welding cable connections.
	3. Low Primary Voltage	a. Contact supply authority
	4. Weld speed too fast	a. Reduce weld speed.
H. Arc does not have a crisp sound that short arc exhibits when the wirefeed speed and voltage are adjusted correctly.	1. The MIG torch has been connected to the wrong voltage polarity on the front panel.	a. Connect the MIG torch to the positive (+) welding terminal for solid wires and gas shielded flux cored wires. Refer to the electrode wire manufacturer for the correct polarity.
	2. Weld speed too fast	a. Reduce weld speed.

Table 6-1b: Welding Problems and Solutions (continued)

6.04 Power Supply Problems

FAULT	CAUSE	REMEDY
A. Mains supply voltage is ON. Indicator light in the ON/OFF Power Switch is not lit and welding arc can not be established.	1. Primary fuses have blown or primary circuit breaker has tripped	Get a qualified electrician to replace the primary fuses or reset the circuit breakers.
	2. Two amp circuit breaker in the wire feed compartment has tripped	Reset the circuit breaker in the wire feed compartment.
B. Indicator light in the ON/OFF Power Switch is illuminated but welding arc can not be established.	1. The ON/OFF Power Switch is off	Switch the ON/OFF Power Switch on
C. Mains indicator light in the ON/OFF Power Switch is not lit and welding arc can be established.	1. Indicator light is open circuit	Have an Accredited Thermal Arc Service Agent replace the ON/OFF Power Switch.
D. Primary input supply voltage is ON and indicator light in the ON/OFF Power Switch is lit but when the gun trigger switch is depressed nothing happens.	1. Gun trigger switch leads are disconnected	Reconnect gun trigger switch leads
	2. Gun Trigger Switch is defective	Replace Gun Trigger
E. Primary input supply voltage is ON, no wire feed but gas flows from the MIG Gun when the gun trigger switch is depressed.	1. Electrode wire stuck in conduit liner or contact tip (burn-back jam)	Check for clogged / kinked MIG Gun conduit or worn contract tip. Replace faulty component(s).
	2. Faulty control PCB or Tweco Gun	Have an Accredited Thermal Arc Service Agent investigate the fault.
F. Wire feeds when the gun trigger switch is depressed but arc can not be established.	1. Poor or no work lead connection	Clean work clamp area and ensure good electrical contact
G. Wire feed and shielding gas ceases but the MIG gun trigger switch is still depressed.	1. The Mode Selector switch is set to Spot 	Set the Mode Selector switch is set to Continuous 
H. Jerky wire feed	1. Worn or dirty contact tip	Replace
	2. Worn feed roll	Replace
	3. Excessive back tension from wire reel hub roll	Reduce brake tension on spool hub
	4. Worn, kinked or dirty conduit liner	Clean or replace conduit liner
	5. Low Swing Arm pressure	Increase the Swing Arm pressure
I. No gas flow	1. Gas hose is cut or pinched	Replace or repair
	2. Gas passage contains impurities	Disconnect gas hose from the rear of Fabricator then raise gas pressure and blow out the impurities.
	3. Gas regulator turned off	Turn on
	4. Empty Cylinder	Refill cylinder
J. Gas flow continues after the gun trigger switch has been released.	1. Gas valve has jammed open due to impurities in the gas or the gas line.	Have an Accredited Thermal Arc Service Agent repair or replace gas valve.

Table 6-2: Power Supply Problems

6.05 Wire Feeder Problems

FAULT	CAUSE	REMEDY
1 Primary input supply voltage is ON. Indicator light is not lit and welding arc can not be established.	A Broken connection in primary circuit	A Have an Accredited Thermal Arc Service Agent check primary circuit.
2 Primary input indicator light is not lit but welding arc can be established.	Burnt out Indicator light	Have an Accredited Thermal Arc Service Agent replace Indicator light.
3 Primary input supply voltage is ON but when the torch trigger switch is depressed nothing happens.	A Torch trigger switch leads are disconnected. Power switch on front of wire feeder is OFF B	A Reconnect. Switch to ON position B
4 Primary input supply voltage is ON, no wire feed but gas flows from the MIG Torch when the torch trigger switch is depressed.	A Electrode wire stuck in conduit liner or contact tip B (burn-back jam). Faulty control PCB	A Check for clogged / kinked MIG Torch conduit liner or worn contract tip. Replace faulty components. Have an Accredited Thermal Arc Service Agent investigate the fault. B
5 Wire feeds when the torch trigger switch is depressed but arc can not be established.	Poor or no work lead contact.	Clean work clamp area and ensure good electrical contact.
6 Jerky wire feed	A Worn or dirty contact tip B Worn feed roll. Excessive back tension from wire reel hub. C D Worn, kinked or dirty conduit liner	A Replace B Replace C Reduce brake tension on spool hub D Clean or replace conduit liner
7 No gas flow	A Gas hose is cut. Gas passage contains impurities. Gas regulator turned off. Empty cylinder. B C D	A Replace or repair. Disconnect gas hose from the rear of Power Source or wire-feeder then raise gas pressure and blow out impurities. Turn on. Replace cylinder. B C D
8 Gas flow continues after the torch trigger switch has been released.	Gas valve has jammed open due to impurities in the gas or the gas line.	Have an Accredited Thermal Arc Service Agent repair or replace gas valve.

Table 6-3: Wire Feeder Problems

SECTION 7:

ADVANCED TROUBLESHOOTING

If the problem cannot be solved by the basic (external) trouble shooting guide, the Power Source covers and/or the Wire Feeder covers will have to be removed. The advanced level of troubleshooting allows the technician with a few common tools to remove the covers and analyze failures.



CAUTION:

Never open the Power Source covers unless the Mains supply voltage to the Power Source is disconnected from the Mains power point and the ON/OFF Power Switch Indicator is off

7.01 Main Circuit Description

NOTE

This description should be read in conjunction with the Fabricator 190 7977964 circuit diagram in the Appendix Section of this manual.

The Fabricator 190 was designed to operate using a 230 VAC, single phase primary line voltage. The ON/OFF Switch (SW1) has an indicator light to alert the operator when the primary line voltage supply to the unit is present. SW1 controls power to the Fan/Aux transformer assembly. With SW1 in the OFF position, all output functions of the unit are disabled. When SW1 is switched to the ON position, 230 VAC is applied to the Fan/Aux transformer (M1) and the fan will operate. The secondary output of M1 is approximately 32 VAC and is connected to PCB1 between JB-4 to JB-5. The Control PCB (PCB1) is powered up and ready for operation.

When a MIG gun trigger switch closure is provided to PCB1 on JA-1 to JA-2, PCB 1 will complete a path for the 32 VAC supplied by M1 to output terminals JB-4 to JB-11. The 32 VAC output is supplied to the gas solenoid (SOL1) and contactor (W1) coil. When W1 energizes, it provides the 230 VAC to the OUTPUT VOLTAGE CONTROL SWITCH (SW2). SW2 is used to select which primary taps on the Main Transformer (T1) will receive the 230 VAC supplied through W1.

The secondary winding of T1 is connected to the Rectifier Assembly (BR1). The BR1 rectifier converts the AC voltage from T1 into DC voltage. The DC voltage is connected to the output terminals via the Output Inductor L1 which helps smooth the output ripple.

There are two Thermal Switches, TS1 and TS2. One is connected to T1 and the other to BR1. When either component gets too hot, the switch closes, causing PCB1 to remove voltage to the W1 coil. When either TS1 or TS2 are opened, the Over Temperature Indicator (LED1) will turn on. After the unit has cooled down and the thermal switch resets, the LED1 will go out and the unit is ready to produce output again.

The DC output voltage is connected to PCB1 between JB-7 to JB-9. PCB1 will use this voltage as the source to then supply the wire feeder motor M2 with supply voltage. The speed is controlled by the Wire Speed Control (R2).

7.02 Test Equipment and Tools

Digital Multimeter with voltage AC/DC and diode test gauge

Screwdriver and 8mm across flats nutdriver

Oscilloscope

7.03 Removal of the Covers

Refer to Section 3.07.



CAUTION:

Leave the Mains supply voltage disconnected from the Power Source during the visual inspection.

1. Remove the door panel to the machine by inserting your left and right index fingers into the two holes marked with arrow and firmly pull it towards you.
2. Remove all the case screws that fix the right hand panel to the Power Source

FABRICATOR 190 WELDING MACHINE

7.04 Pre-Power Up Checks

Visually Inspect

Visually inspect the inside the Power Source. The levels of current present in these units can cause burning or arcing of PCB, transformers, switches, rectifier or contactor when a failure occurs. Carefully inspect all components within these units.

Look in particular for the following:

- a. Loose or broken wires or connectors.
- b. Burned or scorched parts or wires or evidence of arcing.
- c. Any accumulation of metal dust or filings that may have caused shorting or arcing.

If any parts are damaged, they must be replaced. Refer to the Parts List section of this manual for a complete list of components.

Locate the faulty component(s) then replace where necessary.

Vacuum dust and dirt *out* of the entire machine.



CAUTION

Do not blow air into the power supply during cleaning. Blowing air into the unit can cause metal particles to interfere with sensitive electrical components and cause damage to the unit.

At this point, apply primary voltage to the Power Source.



CAUTION:

There are extremely dangerous voltage and power levels present inside this Power Source. Do not attempt to diagnose or repair unless you have had training in power electronics measurement and troubleshooting techniques.

Once power is applied to the Power Source, there are extremely hazardous voltage and power levels present. Do not touch any live parts.

7.05 Initial Setup Conditions

1. Set the power supply controls and connect cables as follows:

ON/OFF Switch to OFF Position

MODE SELECTOR SWITCH to CONTINUOUS Position

WIRESPEED CONTROL to "4"

SPOT TIMER CONTROL to "0"

BURNBACK CONTROL to minimum (Fully Counter-Clockwise)

2. Disconnect and isolate the GUN POLARITY LEAD from the OUTPUT WELDING TERMINALS.
3. Connect the work cable to the (-) NEGATIVE OUTPUT WELDING TERMINAL.
4. Open the PRESSURE ADJUST DEVICE so the wire will not feed.

7.06 Primary Power Test

1. Close primary disconnect device and observe the following:

Green Indicator Lamp inside ON/OFF Switch illuminates

2. Set the ON/OFF Switch to the ON position and observe the following:

Fan turns on

This completes the Primary Power Test. If the above are all correct then proceed to Section 7.05. If the above does not function as noted then note the symptom and proceed to Section 7.10 Primary Power Problems.

7.07 Logic And Control Tests

1. Depress Gun Switch and observe the following
 - Gas flows
 - Contactor energizes
 - Drive Roll Turns
2. Release Gun Switch
 - Gas flow stops
 - Contactor de-energizes
 - Drive roll stops
3. Set BURNBACK CONTROL potentiometer to maximum position (Clockwise)
4. Depress Gun Switch and observe the following
 - Gas flows
 - Contactor energizes
 - Drive roll turns
5. Release Gun Switch
 - Drive Roll stops immediately
 - After 1.5 seconds
 - Gas flow stops
 - Contactor de-energizes
6. Set BURNBACK CONTROL potentiometer to minimum (Counter Clockwise)
7. Set MODE SELECTOR SWITCH to SPOT position
8. Depress Gun Switch
 - Gas Flows
 - Contactor energizes
 - Drive roll turns
 - After .5 seconds
 - Gas flow stops
 - Contactor de-energizes
 - Drive roll stops
9. Set SPOT TIMER CONTROL to Maximum position (10)

10. Depress Gun Switch

- Gas flows
- Contactor energizes
- Drive roll turns
- After 4.5 seconds
 - Gas flow stops
 - Contactor de-energizes
 - Drive roll stops

11. Connect voltmeter probes to JB-6 (-) and JB-8 (+). Depress the gun trigger and vary the WIRE SPEED CONTROL potentiometer from minimum to maximum. The voltage should vary from approximately 2 VDC up to approximately 25 VDC.

12. Set WIRE SPEED CONTROL to "4"

This completes the Logic and Control Tests. If the above are all correct then proceed to Section 7.08. If the above does not function as noted then note the symptom and proceed to Section 7.11 Logic and Control Problems.

FABRICATOR 190 WELDING MACHINE

7.08 Output Voltage Test

1. Set MODE SELECTOR SWITCH to CONTINUOUS position.
2. Connect voltmeter probes to + and - Output Terminals
3. Depress Gun Switch and observe voltage
4. Repeat voltage measurements in each of the 8 positions of the OUTPUT VOLTAGE CONTROL SWITCH. The voltages should measure as outlined in the chart

Switch Settings	Voltage
SW1(Coarse): 1	25.5...26.9
SW1(Coarse): 2	28.0...29.4
SW1(Coarse): 3	30.5...32.4
SW1(Coarse): 4	34.0...35.7
SW1(Coarse): 5	37.5...40.0
SW1(Coarse): 6	42.0...45.1
SW1(Coarse): 7	48.0...51.8
SW1(Coarse): 8	56.5...60.4

This completes the Output Voltage Tests. If the above are all correct then proceed to section 7.07. If the above does not function as noted then note the symptom and proceed to Section 7.12 Output Voltage Problems.

7.09 Wire Feed Test

1. Close the PRESSURE ADJUST DEVICE. Connect the GUN POLARITY LEAD to the POSITIVE WELDING TERMINAL (+).
2. Position the gun in a position ready to weld. Close the Gun Switch.

Gas flows

Contactor Energizes

Wire feeds out of gun

Welding arc establishes

This completes the Wire Feed Test. If the above does not function as noted then note the symptom and proceed to Section 7.13 Wire Feed Problems.

7.10 Primary Power Problems

A. Green Indicator in ON/OFF Switch is not illuminated and fan does not turn when ON/OFF switch is in the ON position.

1. *Incorrect or insufficient primary voltage*
 - a. Measure voltage at Primary Power Receptacle. If voltage is not correct check primary fuses/ breakers.
2. *Defective or improperly wired input power cable or plug*
 - a. Measure for 230VAC primary voltage at the terminal block where the input power cable is connected. If incorrect, check wiring in plug and continuity of primary input cable.
3. *Circuit breaker in unit tripped*
 - a. Reset breaker
4. *Defective or improperly wired input power cable or plug*
 - a. Measure for 230VAC primary voltage at the terminal block where the input power cable is connected.

B. Green Indicator in ON/OFF Switch is illuminated but fan does not turn when ON/OFF switch is in the ON position.

1. *Defective ON/OFF Switch*
 - a. Measure for 230VAC between white (#25) and orange (#26) wires on the switch. Replace if voltage is not present.
2. *Defective Fan*
 - a. Measure for 230VAC between blue (#25) and black (#26) wires on the fan. If voltage is present, replace the fan.

7.11 Logic and Control Problems

A. Nothing happens when gun switch is depressed; No gas flow, contactor does not energize, feed roll does not turn. TEMPERATURE LED is on.

1. *Unit overheated*
 - a. Allow unit to cool
2. *Insufficient airflow around / through unit*
 - a. See Installation Section 3
3. *Defective fan*
 - a. Replace fan
4. *Open Thermal Protection Switch*
 - a. Check continuity and replace if open

B. Nothing happens when gun switch is depressed; No gas flow, contactor does not energize, feed roll does not turn. TEMPERATURE led is off.

1. *Defective gun switch*
 - a. Check continuity of gun switch
2. *Faulty Fan/Aux. transformer assembly*
 - a. Measure for approximately 30 VAC between the brown (#20A) and orange (#21B) If low or not present replace Fan/Aux Transformer Assembly.
3. *Faulty Control PCB*
 - a. Measure between JA-1 to JA-2 at the Control PCB for approximately 40 VDC when gun switch is open. If voltage is not present, replace Control PCB. See PCB Replacement NOTE on page 7-8.
4. *Open wires between gun receptacle and Control PCB*
 - a. Measure between JA-1 to JA-2 at the Control PCB for approximately 40 VDC when switch is open and then drops to 0 VDC when gun switch is closed. If it does not drop check continuity of the wires.
5. *Faulty Control PCB*
 - a. Measure between JB-4 to JB-11 at the Control PCB for approximately 30 VAC when gun switch is closed. If voltage is not present, replace Control PCB. See PCB ReplacementNOTE on page 7-8.

FABRICATOR 190 WELDING MACHINE

6. Open wires between Control PCB and Contactor coil

- a. Measure between orange wire (#21A) to white wire (#22A) at the Contactor for approximately 30 VAC when gun switch is closed. If voltage is not present, replace open wires from Control PCB.

C. When gun switch is closed, gas flows, feed roll does not turn, contactor does not energize

1. Defective contactor

- a. Measure for 30 VAC on the contactor coil between orange wire (#21A) and white wire (#22A). If voltage is present replace contactor.

D. When gun switch is closed, gas flows, feed rolls do not turn, contactor does not energize.

1. Defective contactor

- a. With gun switch closed, measure for 30 VAC on the contactor coil between Orange wire (#21A) and white wire (#22A). If voltage is present, replace contactor.

D. When Gun Switch is closed, contactor closes, feed roll turns but no gas flows.

1. Defective Gas Solenoid

- a. With gun switch closed, measure for 30 VAC on the gas solenoid between Orange wire (#21A) and white wire (#22A). If voltage is present, replace gas solenoid.

E. When Gun Switch is closed, gas flows, contactor closes, but feed roll does not turn.

1. Defective contactor

- a. With Gun Switch closed, measure for 230VAC at the contactor between terminals T1 to T2. If voltage is low or not present, replace contactor.

2. Defective wire feed motor

- a. With Gun Switch closed, measure for approximately 2-25 VDC variation at the control PCB between JB-6 to JB-8 as the WIRE SPEED CONTROL potentiometer is varied from Minimum to maximum. If voltage is correct, replace motor.

3. Defective Output Voltage Control Switch

- a. See Output Voltage Control Switch test procedure on page 7-7.

4. Defective Rectifier assembly

- a. Check per the rectifier assembly test procedure on page 7-8.

5. Defective Main transformer

- a. Check main transformer per test procedure on page 7-8

6. Open wire from Rectifier assembly to Control PCB

- a. With gun switch closed, measure for approximately 27 VDC at Control PCB between JB7 (-) to JB9 (+). If no voltage, check wire continuity and replace open wire.

7. Faulty Control PCB

- a. With gun switch closed, measure voltage between JB-6(-) to JB-8 (+) for approximately 10 VDC. If voltage is 0 VDC, replace Control PCB. See NOTE below.

NOTE: PCB 7977964 Replacement

When replacing the the 7977964 Control PCB, be sure to remove the jumper that connects pins JD1 to JD2 from the old PCB and re-use it in the new one by pushing it on the same two pins. See Appendix 3.

7.12 Output Voltage Problem

A. Output is low in one or more OUTPUT VOLTAGE CONTROL SWITCH positions

1. Defective OUTPUT VOLTAGE SELECTION SWITCH

- a. Check continuity of switch. See test procedure on page 7-7.

2. Defective MAIN TRANSFORMER

- a. Check Main transformer per test procedure on page 7-8.

7.13 Wire Feed Problems

A. Inconsistent or no wire feed

1. See Section 6.05 for feed problems.

B. Poor or inconsistent arc transfer or no arc transfer

1. Poor work cable connection or open work cable.

- a. Clean contact point, check continuity of cable and cable to clamp connection. Replace if work cable if required.

7.14 Test Procedures

OUTPUT VOLTAGE CONTROL SWITCH

The switch will apply 230VAC line voltage to different input taps to the Main Transformer.

With gun switch closed, check for 230 VAC between terminal T2 on the contactor to each of the following terminal points on the switch:

<u>OUTPUT VOLTAGE CONTROL SWITCH position #</u>	<u>To Switch terminal #</u>
1	11
2	11
3	5
4	5
5	9
6	9
7	3
8	3

With gun switch closed, measure for 0 VDC between Switch Terminal #2 to each of the following terminals points on the switch.

<u>OUTPUT VOLTAGE CONTROL SWITCH terminal #</u>	<u>To Switch position #</u>
1	1
2	3
3	1
4	3
5	1
6	3
7	1
8	3

If voltages are not correct, replace the switch.

FABRICATOR 190 WELDING MACHINE

RECTIFIER ASSEMBLY TEST

Disconnect one of the Main Transformer connections from the rectifier assembly. Disconnect JB connector from Control PCB.

Using a meter check for a forward biased diode between the following points:

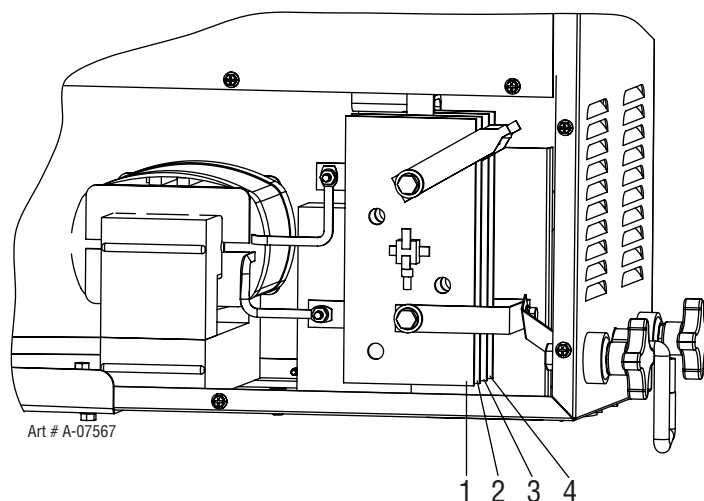


Figure 7.1: Rectifier Test Points

Positive meter probe on NEGATIVE WELDING TERMINAL (-) to Plates #2 and 3

Negative meter probe on NEGATIVE WELDING TERMINAL (-) to Plates #2 and 3

Positive meter probe on POSITIVE WELDING TERMINAL (+) to plates #2 and 3

Negative meter probe on POSITIVE WELDING TERMINAL (+) to plates #2 and 3

With Positive meter probe on the NEGATIVE WELDING TERMINAL (-) and the negative meter probe on POSITIVE WELDING TERMINAL (+), you should read a forward bias drop of two (2) diodes.

MAIN TRANSFORMER TEST

Measure output voltage between the two transformer connections as follows:

<u>OUTPUT VOLTAGE CONTROL SWITCH position #</u>	<u>VOLTAGE</u>
1	21.2 VAC
2	22.9 VAC
3	25 VAC
4	27.5 VAC
5	30.4 VAC
6	34.1 VAC
7	38.7 VAC
8	44.9 VAC

SECTION 8: CIRCUIT OPERATION

8.01 Circuit Operation Of The Control PCB 7977964

Power Supply

24VAC is taken from the auxiliary wiring of the fan. This voltage is then connected to the PCB 7977964 where it is half wave rectified and filtered. This voltage is then fed to a zener regulator to provide the +15VDC supply for the electronics on the circuit board

Inputs to the Control PCB

CONNECTOR JA

Terminal	JA-1
trigger input=40VDC trigger open, approx 20VDC trigger	closed
reference JA-5	
Terminal	JA-2
trigger input=0VDC trigger open, approx 20VDCV trigger	closed
reference JA-5	
Terminal	JA-3
spot timer pot=12VDCV trigger closed 0VDC trigger	open
reference JA-5	
Terminal	JA-4
spot timer pot= ramps up to 12V from 0V when trigger closed	
0VDC when trigger open	
reference JA-5	
Terminal	JA-5
PCB common	
Terminal	JA-6
over temperature LED anode = approx 2VDC when overtemp led is ON, 0V when off	
reference JA-5	
Terminal	JA-7
over temperature switch=0VDC temp switch closed, approx 15VDCV switch open	
reference JA-5	

CONNECTOR JE

Burnback potentiometer
100k potentiometer between pins

Terminal	JE-1
burnback potentiometer 0VDC	
reference PCB common	
Terminal	JE-2
burnback potentiometer approx 13VDC when trigger on	
ramps down to zero after trigger is released	
reference JA-5	

FABRICATOR 190 WELDING MACHINE

CONNECTOR JB

Terminal	JB-1
wiper of wire speed control potentiometer, varies between <2V to approximately 4.7VDC (pot wiper)	
reference	JA-5 or JB-5
Terminal	JB-2
wire speed control potentiometer minimum (pot low) approximately 2VDC	
reference	JA-5
Terminal	JB-3
wire speed control potentiometer maximum approximately 4.7VDC	
reference	JA-5
Terminal	JB-4
32VAC supply from auxiliary winding on fan	
reference	JA-5 or JB-5
Terminal	JB-5
PCB common. Return for 32VAC supply from auxiliary winding on M1	
Terminal	JB-6
Motor positive terminal 0VDC - 24VDC with speed pot	
reference	JB-8
Terminal	JB-7
negative welding output voltage	
reference	JB-9
Terminal	JB-8
Motor negative terminal 0VDC to -24VDC with speed pot	
reference	JB-6
Terminal	JB-9
positive welding voltage	
Terminal	JB-10
return for 32VAC supply from auxiliary winding on M1	
reference	JB-5
Terminal	JB-11
relay contact to control SOL1 & W1 closes to complete circuit to JB-10	
reference	JB-4

CONNECTOR JB

Torch circuit jumper installed

SECTION 9: PARTS LIST

9.01 Equipment Identification

All identification numbers as described in the Introduction chapter must be furnished when ordering parts or making inquiries. This information is usually found on the nameplate attached to the equipment. Be sure to include any dash numbers following the Part or Assembly numbers.

9.02 How To Use This Parts List

The Parts List is a combination of an illustration and a corresponding list of parts which contains a breakdown of the equipment into assemblies, subassemblies, and detail parts. All parts of the equipment are listed except for commercially available hardware, bulk items such as wire, cable, sleeving, tubing, etc., and permanently attached items which are soldered, riveted, or welded to other parts. The part descriptions may be indented to show part relationships.

To determine the part number, description, quantity, or application of an item, simply locate the item in question from the illustration and refer to that item number in the corresponding Parts List.

PARTNUMBER:

Fabricator 190

W1001500

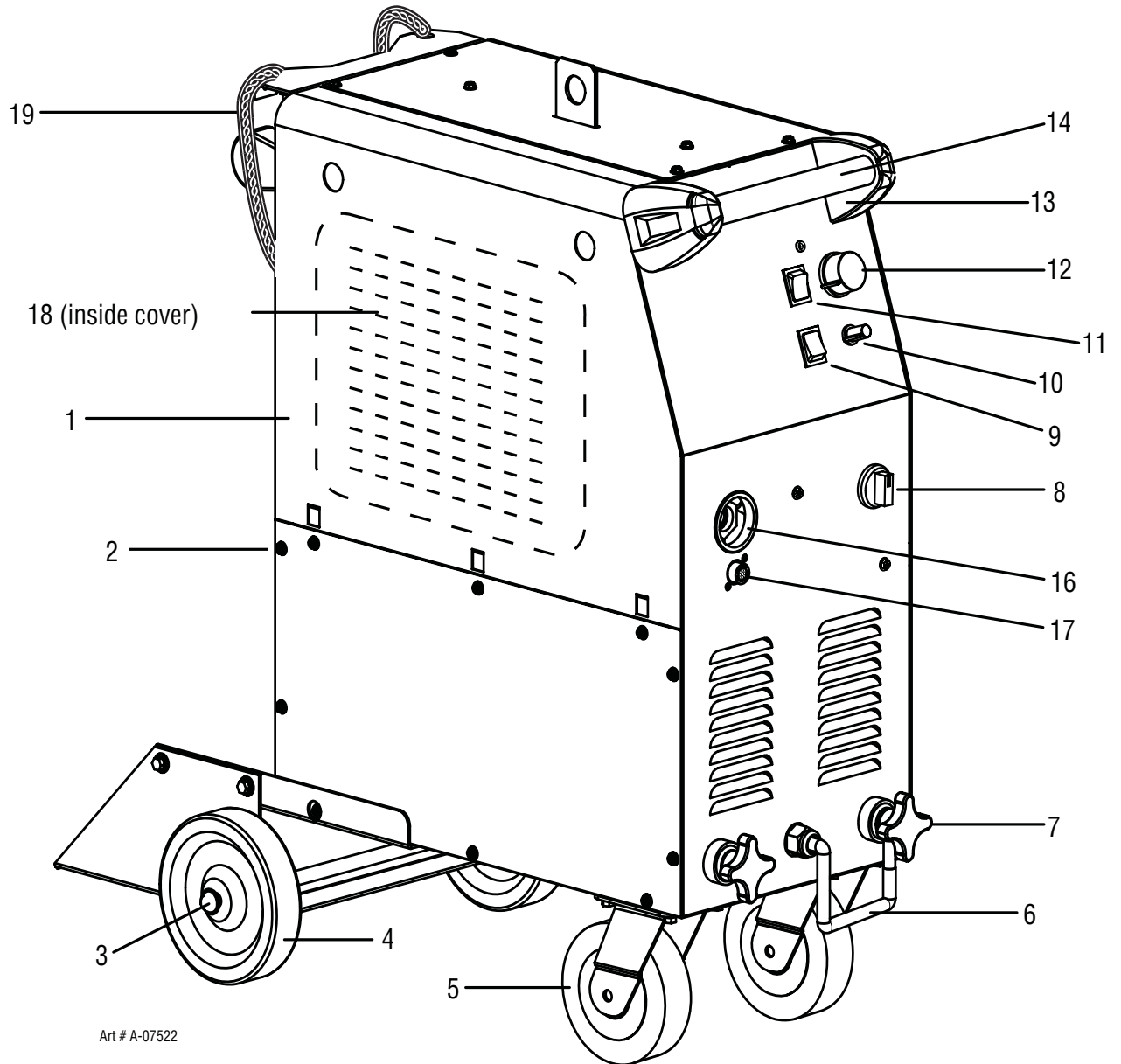
FABRICATOR 190 WELDING MACHINE

9.03 External Replacement Parts (1)

ITEM	PART NUMBER	DESCRIPTION	REF. DES.	QTY
1	707241PKD	Panel,Lift Out Door,Fab190		1
2	See Note 1	Screw,Hex HD,M5x13mm,Self Tap		38
3	NB2157	Cup, Retaining, 1/2" ID		2
4	7976759PKD	Wheel, 1/2" IDx6" OD		2
5	7977566	Castor, Swivel, 5" Wheel		2
6	7901117PKD	Cable,Torch Polarity,Fab190		1
7	7977978	Knob,Output Terminal,Fabs		2
8	7977739PKD	Switch,32A,8 Pos, Fab190	SW2	1
9	7977721PKD	Switch, DPDT,10A, 250V	SW1	1
10	870734	Knob,Control,1/4" IDx.57"		1
11	7977884PKD	Switch,DPST,Grn,16A,250V	SW3	1
12	870696PKD	Knob,Control,1/4" IDx1.6"		1
13	705936PKD	Handle Mount, Fabricator		2
14	706517PKD	Handle Bar, Fab190		1
16	7978029PKD	Bushing, Snap, 1.69" ID		1
17	707296PKD	Harness,Control Wiring Fab190		1
18	831255PKD	Label,Weld Guide,Fab190		1
19	705620PKD	Chain,700mm Long,Fabricators		1

Note 1

These parts are available at most hardware stores.



Art # A-07522

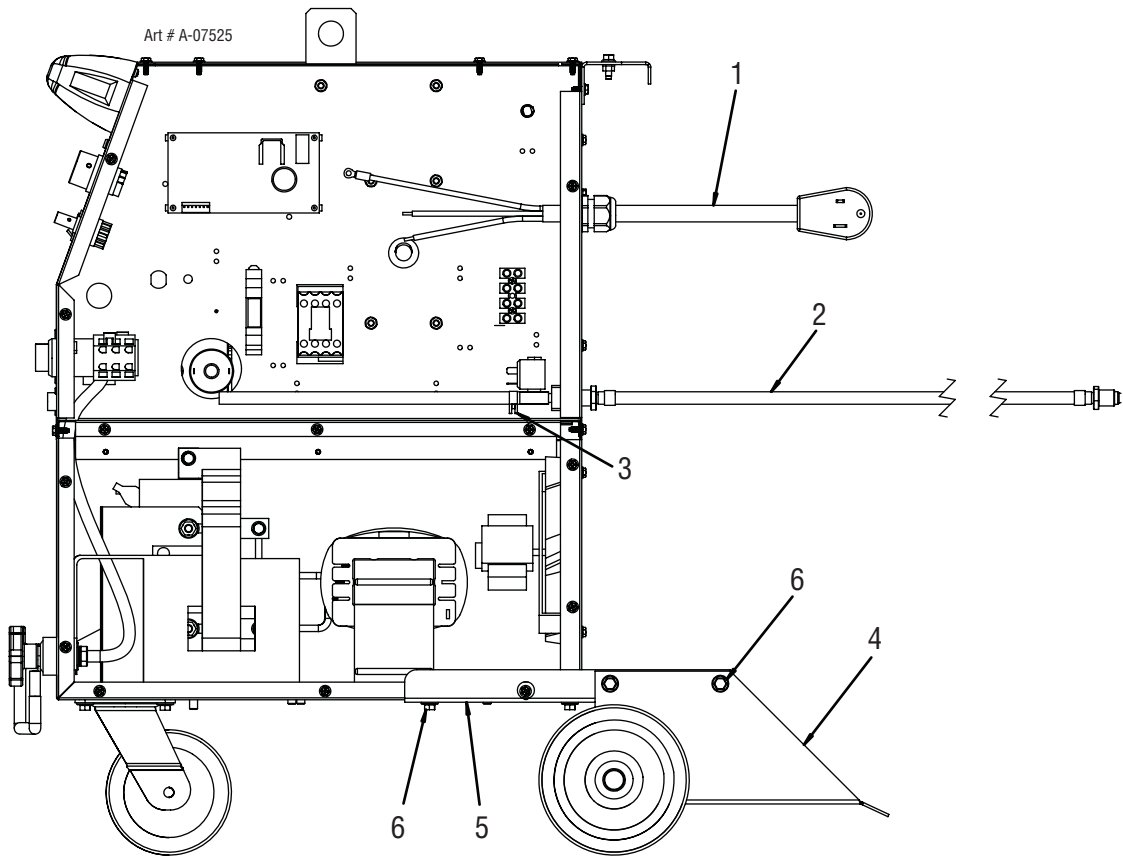
FABRICATOR 190 WELDING MACHINE

9.04 External Replacement Parts (2)

ITEM	PART NUMBER	DESCRIPTION	QTY
1	401840-004	Cable, Power Cable, Fab190/210	1
2	707206PKD	Gas Hose,5/8"BSP,Fabricators	1
3	See Note 1	Wire Tie, Nylon, 4"	2
4	707219WBLKPKD	Bracket,Bottom,Cyl,Fab190	1
5	707218WBLKPKD	Bracket,Top,Cyl,Fab190	1
6	See Note 1	Screw,Hex HD,M8x12mm,Self Tap	20

Note 1

These parts are available at most hardware stores.

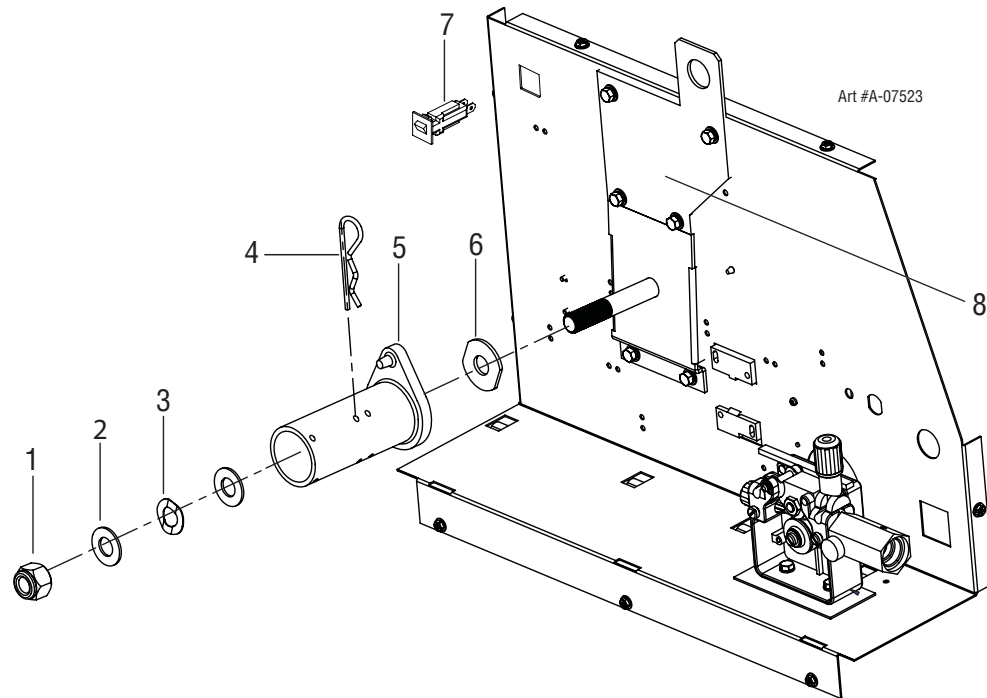


9.05 Internal Replacement Parts-Wire Spool Assembly

ITEM	PART NUMBER	DESCRIPTION	REF. DES.	QTY
1	See Note 1	Nut, Hex, Nylon, 5/8" BSW		1
2	See Note 1	Washer,5/8", Flat		2
3	See Note 1	Washer,5/8",Wave		1
4	OTWAK1PPKD	Pin, Locking Reel Hub		1
5	702337PKD	Hub, Wire Spool, Fab190		1
6	7976411PKD	Washer,Friction,Fab190 Hub		1
7	7978041PKD	Circuit Breaker, 2A	CB1	1
8	707221WBLKPKD	Bracket,Wire Spool,Fab190		1

Note 1

These parts are available at most hardware stores.



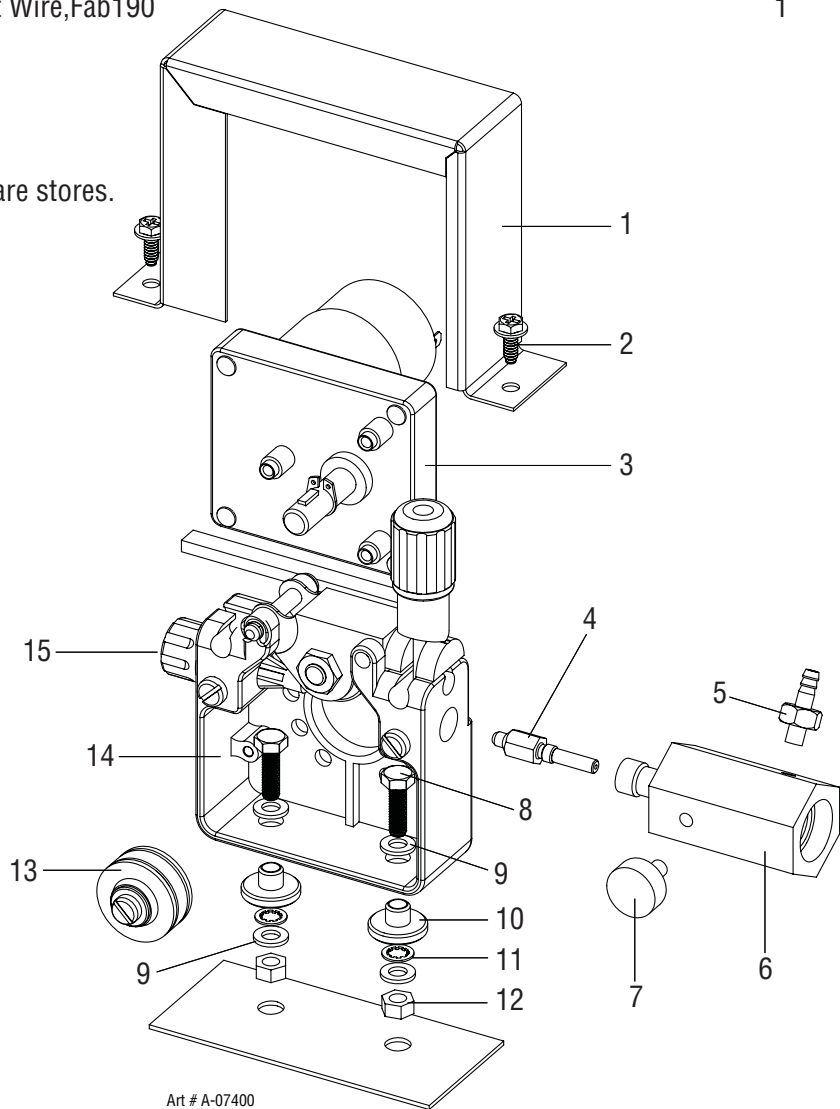
FABRICATOR 190 WELDING MACHINE

9.06 Internal Replacement Parts-Wire Feeder

ITEM	PART NUMBER	DESCRIPTION	REF. DES.	QTY
1	707096PKD	Bracket,Wire Drive,Fab190		1
2	See Note 1	Screw,Hex HD,M5x13mm,Self Tap		2
3	7978012PKD	Motor, Wire Drive, 2R, Fab190	M2	1
4	871101PKD	Outlet, Wire Guide, Fab190		1
5	871002PKD	Nipple,M6-1.0,Hose Barb 5mm		1
6	871100PKD	Adaptor, Tweco No4,Fab190		1
7	10-6187	Knob, Torch Locking		1
8	See Note 1	Bolt, Hex HD,M6x20		2
9	See Note 1	Washer, 3/8",Flat		2
10	706874PKD	Insulator,Screw mtg,Fab190		2
11	See Note 1	Washer,6.4mm,Int Lock		2
12	See Note 1	Nut, Hex, M6-1,STZP		2
13	7977036	Drive RL Fab190.023/.035 "V"		1
14	7978030PKD	Feed Plate Assy,2R,Fab190		1
15	10-6144	Guide, Inlet Wire,Fab190		1

Note 1

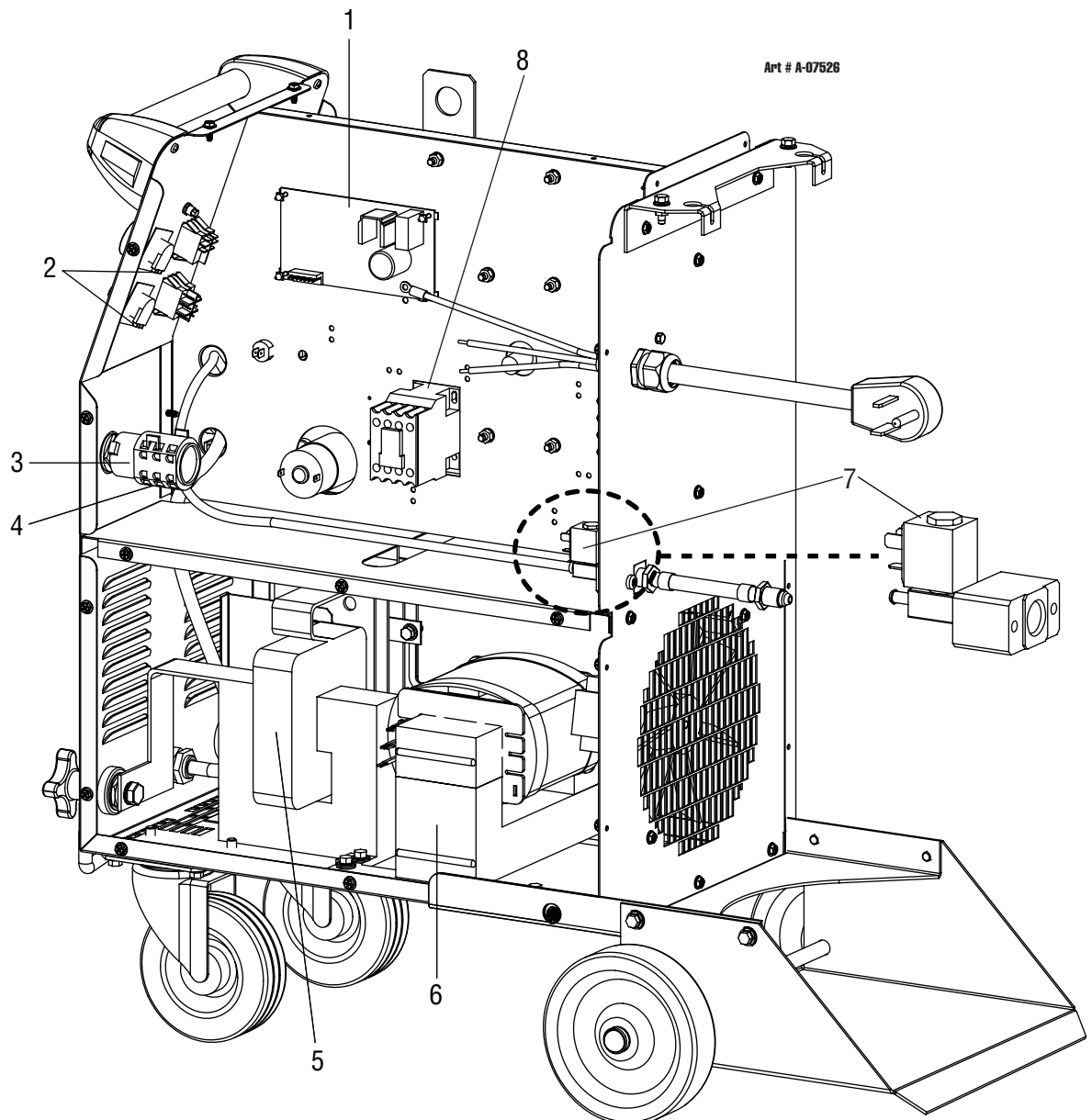
These parts are available at most hardware stores.



Art # A-07400

9.07 Electrical Components (1)

ITEM	PART NUMBER	DESCRIPTION	REF. DES.	QTY
1	7977964	PCB, Control, Fabricators	PCB1	1
2	707296PKD	Harness,Control Wiring Fab190		1
3	7977739PKD	Switch,32A,8 Pos, Fab190	SW2	1
4	707334PKD	Harness,Power Wiring,Fab190		1
5	706291PKD	Reactor,Fab190	L1	1
6	707295PKD	Transformer,Fab190	T1	1
7	707204PKD	Solenoid Assy,Fabricators	SOL1	1
8	7978001PKD	Contactor,32A,3 Pole,24VAC	W1	1



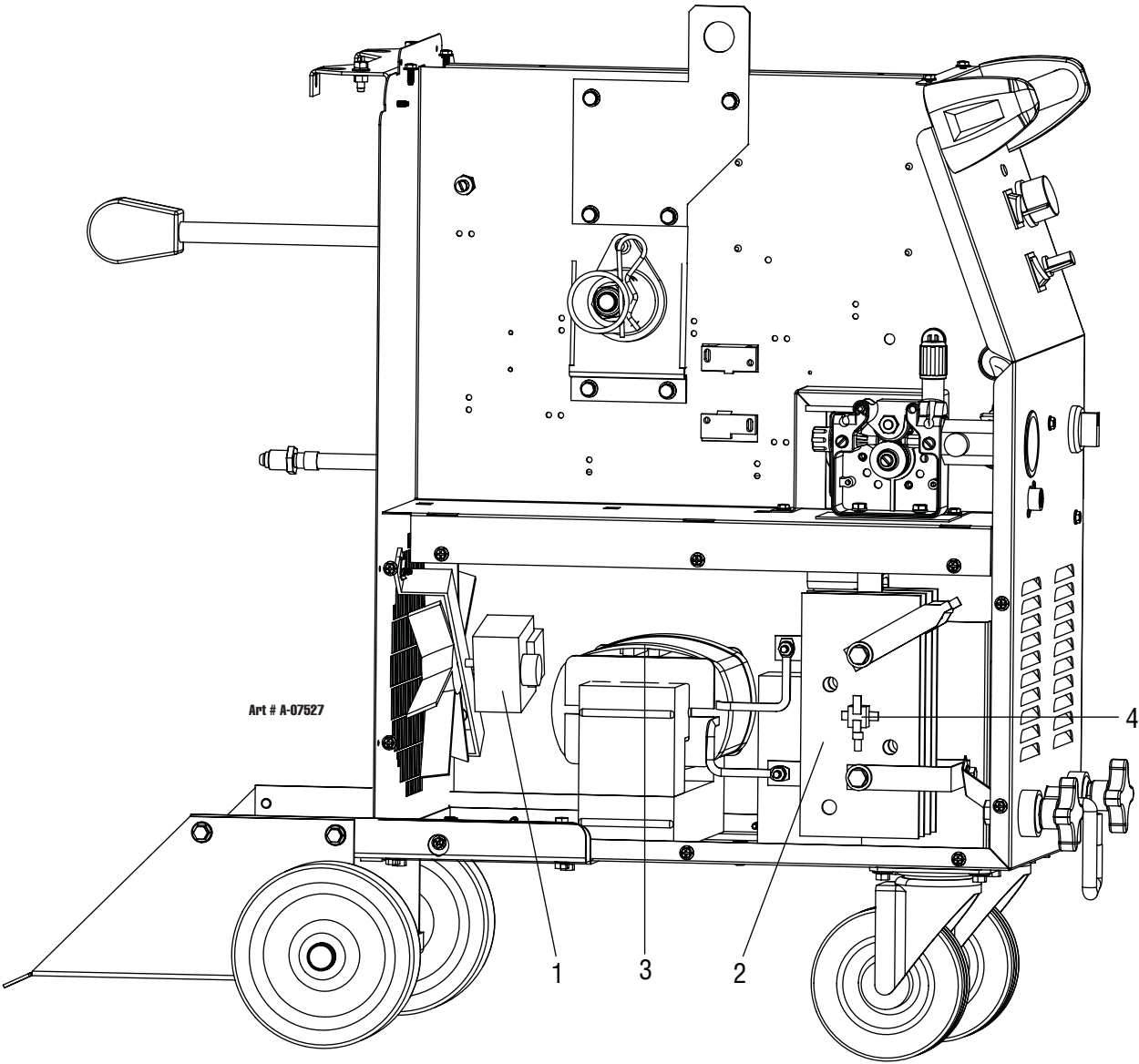
FABRICATOR 190 WELDING MACHINE

9.08 Electrical Components (2)

ITEM	PART NUMBER	DESCRIPTION	REF. DES.	QTY
1	7978038PKD	Fan Assy, 208-230VAC,8",24Vac	M1	1
2	7977745PKD	Rectifier, 250A,Fab190	BR1	1
3	7977935PKD	Switch, Thermostat, 170°C,10"	TS1	1
4	See Note 1	Switch,Thermostat, 100°C	TS2	1

Note 1

This is part of the rectifier

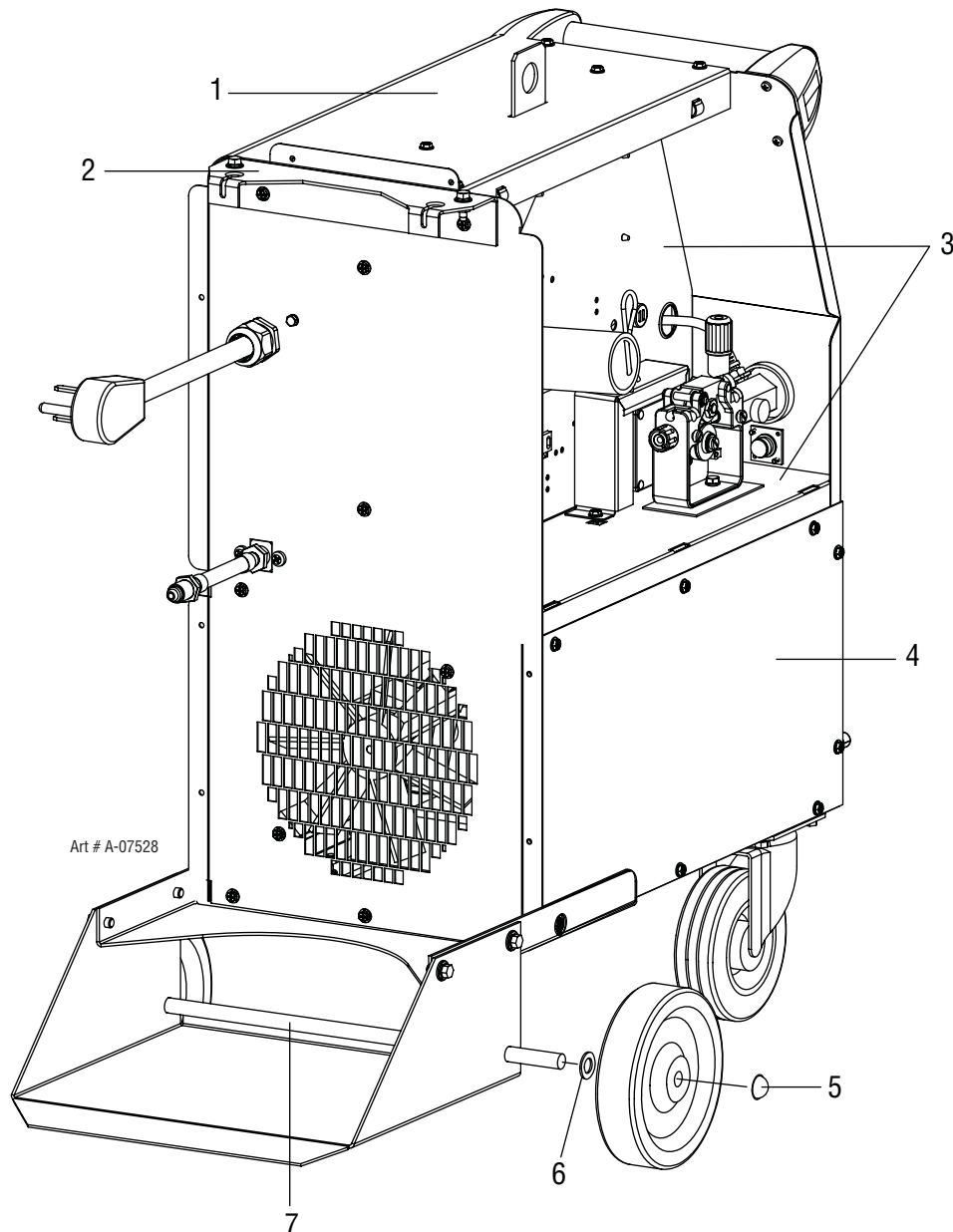


9.09 Wheel Axle and Body Panels

ITEM	PART NUMBER	DESCRIPTION	QTY
1	707239PKD	Panel, Cover RH, Fab190	1
2	707217WBLKPKD	Bracket,Cylinder,Fab190	1
3	707207WBLKPKD	Panel,Internal,Fab190	1
4	707187CLAPKD	Panel, Side LH, Fab190	1
5	NB2157	Cup, Retaining, 1/2" ID	2
6	See Note 1	Washer,1/2" IDx1" OD,Flat	2
7	871022PKD	Axle, 1/2" Dia x 15.8" Long	1

Note 1

These parts are available at most hardware stores.



APPENDIX 1: OPTIONS AND ACCESSORIES

- Contact your Thermal Arc distributor to order options and accessories. For assistance in locating a Thermal Arc distributor, contact the Thermadyne office listed in the inside rear cover that is nearest to you.
- Note the model and specification number shown on the equipment nameplate.

For Tweco/Victor Inquiries and Orders:

Call 1-800-318-6819 Consumable Parts Management Group

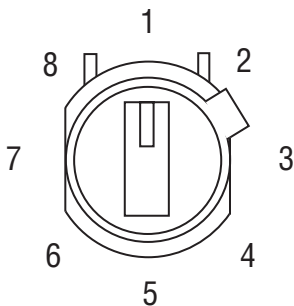
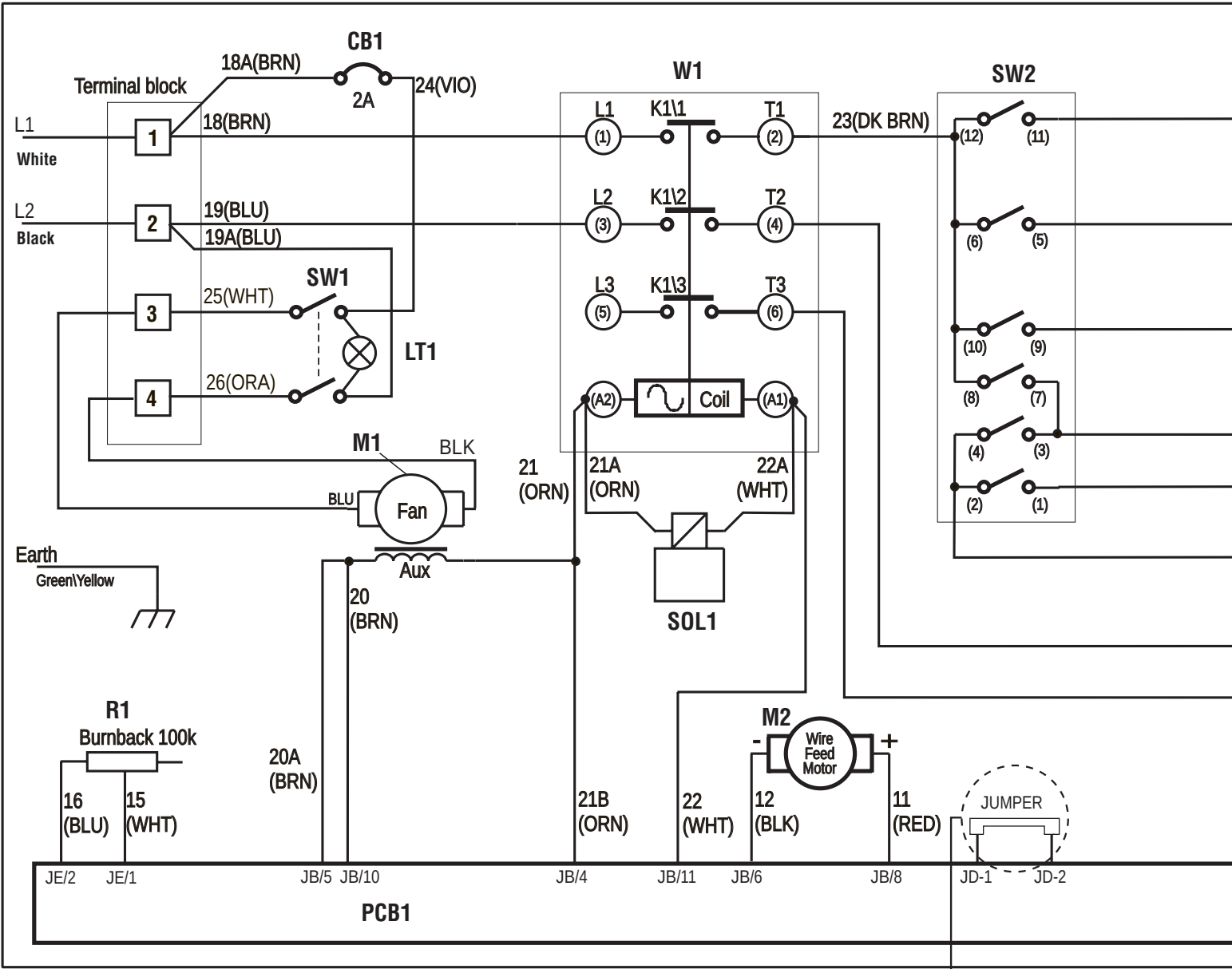
EQUIPMENT OPTIONS	PART NO	Description
GUNS		
Tweco® WeldSkill 10ft	10217	Gun Assembly with 10ft cable (supplied with package), 200 Amp @ 30%
Tweco® No. 2 10ft	210-3035	Gun Assembly with 10ft cable 250 Amp @ 60%
Tweco® No. 2 12ft	212-3035	Gun Assembly with 12ft cable 250 Amp @ 60%
Tweco® Spraymaster 10ft	MS210-3545	Gun Assembly with 10ft cable 250 Amp @ 80%
Tweco® Spraymaster 12ft	MS212-3545	Gun Assembly with 12ft cable 250 Amp @ 80%
ACCESSORIES		
MIG gun control lead & 4 pin plug	MSAK-354	Connection lead between TWECO MIG guns & Fabricator 190 Medalist™ 1400 Series, HRF Flowmeter Regulator, Argon-Argon/CO2 mix gases
Victor Regulator/Flowmeter Mixed Gases	0781-2723	Medalist™ 1400 Series, HRF Flowmeter Regulator, CO2 gas
Victor Regulator/Flowmeter CO2	0781-2725	
Cylinder Retaining Chain	705620PKD	CHAIN DIA 3 X 22 X 700 LONG
CONSUMABLES		
Feedroll Kits		
Feedroll .023"-.030"/.035" (0.6-0.8/0.9mm)	7977036	V grooved for hard wire
Feedroll .035"-.045" (0.9-1.2mm)	7977660	V grooved for hard wire
Feedroll .030"-.035" (0.8-0.9mm)	7977731	U grooved for soft wire
Feedroll .040"-.045" (1.0-1.2mm)	7977264	U grooved for soft wire
Feedroll .030"-.035" (0.8-0.9mm)	7977732	V grooved knurl for cored wire
Feedroll .045"-.1/16" (1.2-1.6mm)	704277	V grooved knurl for cored wire
Contact Tips		
	11-23	.023" (0.6mm)
	11-30	.030" (0.8mm)
	11-35	.035" (.09mm)
	11-40	.040" (1.0mm)
	11-45	.045" (1.2mm)
Nozzles		
	21-37	3/8" (9.5mm)
	21-50	1/2" (12.7mm)
	21.62	5/8" (16mm)
Conduits		
	42-23-15	.023", 15 ft.(7.6m)
	42-3035-15	.030-.035", 15ft. (4.5m)
	42-4045-15	.040-.045", 15ft. (4.5m)
	42N-3545-15	.035-3/64", 15ft. (4.5m)
Gas Diffuser	51	

APPENDIX 2: OPTIONS AND ACCESSORIES (CON'T)

SPOT WELDING NOZZLES					
TYPE	MINI & NO. 1 150 AMP	NO. 2 250 AMP	NO. 3	NO. 4 400 AMP	NO. 5 500 AMP
Flat Arc Spot	21-62-FAS 1210-1520 (5/8" Bore)	22-62-FAS 1220-1520 (5/8" Bore)	23-75-FAS 1230-1530 (3/4" Bore)	24A-62-FAS 1240-1520 (5/8" Bore)	25CT-125-FAS 1250-1560 (1-1/4" Bore)
				24A-75-FAS 1240-1530 (3/4" Bore)	25CT-162-FAS 1250-1570 (1-5/8" Bore)
				24A-100-FAS 1240-1550 (1" Bore)	
Inside Corner Arc Spot	N/A	22-62-IAS 1220-1521 (5/8" Bore)	N/A	24A-75-IAS 1240-1531 (3/4" Bore)	N/A
Outside Corner Arc Spot	N/A	22-62-IAS 1220-1522 (5/8" Bore)	N/A	24A-75-IAS 1240-1532 (3/4" Bore)	N/A
Automotive Stud Nozzle	21-62 SAS 1210-1524	N/A	N/A	N/A	N/A

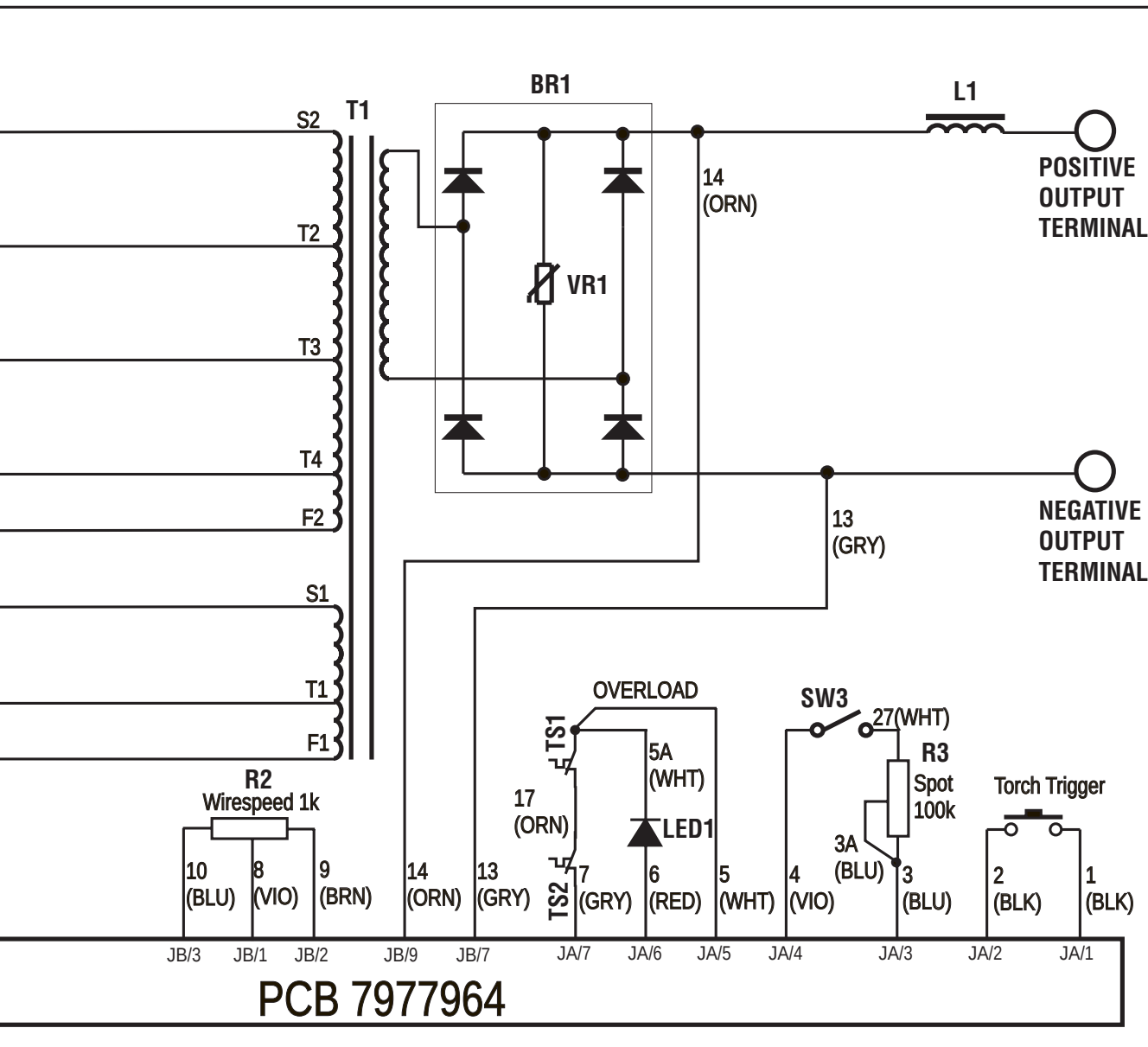
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APPENDIX 3: POWER SUPPLY CIRCUIT DIAGRAM



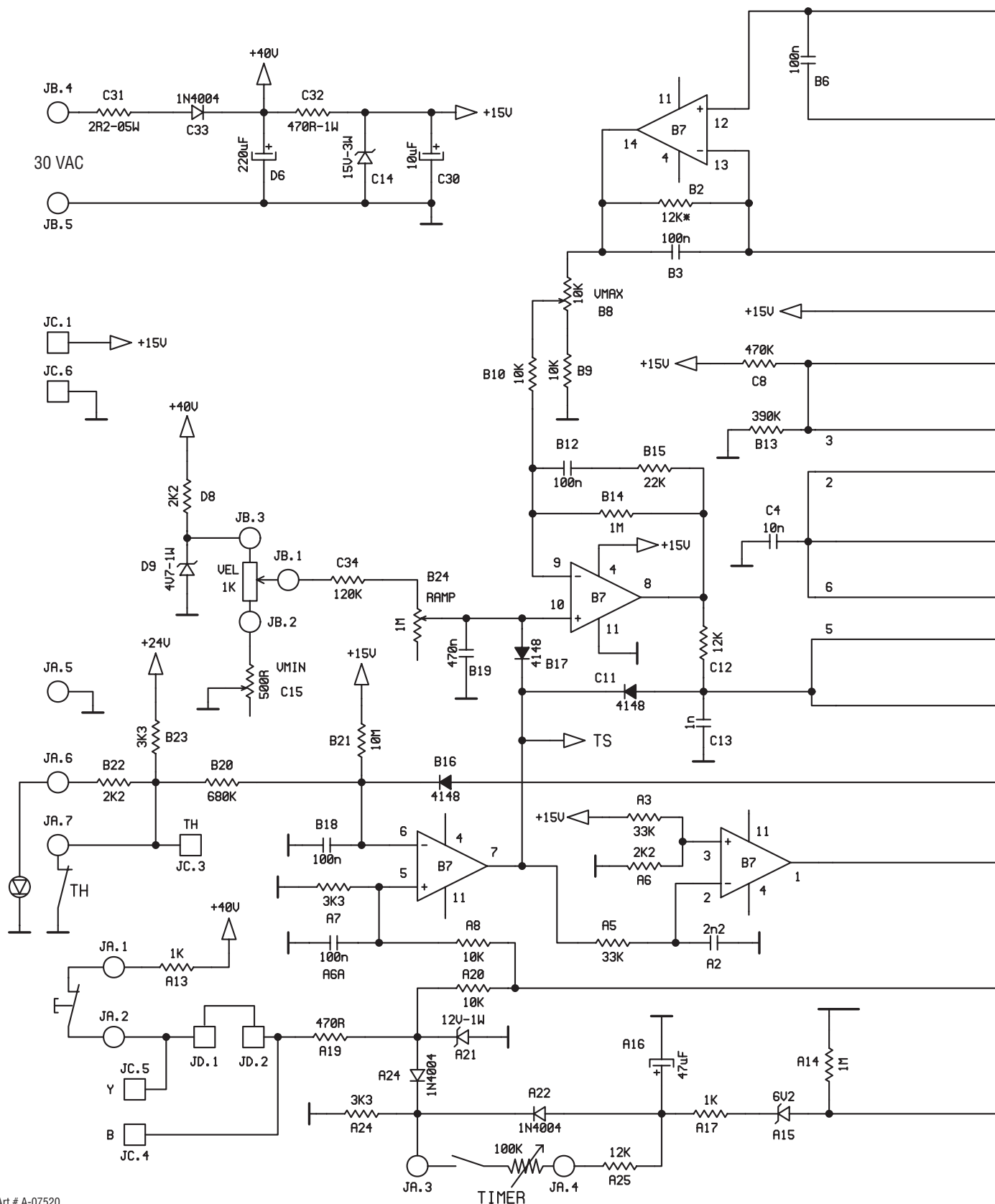
SWITCH 2						
SWITCH POSITION	1 2	3 4	5 6	7 8	9 10	11 12
1	X					X
2		X				X
3	X		X			
4		X	X			
5	X				X	
6		X			X	
7	X			X		
8		X		X		

NOTE:
Re-use this jumper
when replacing the
7977964 Control PCB

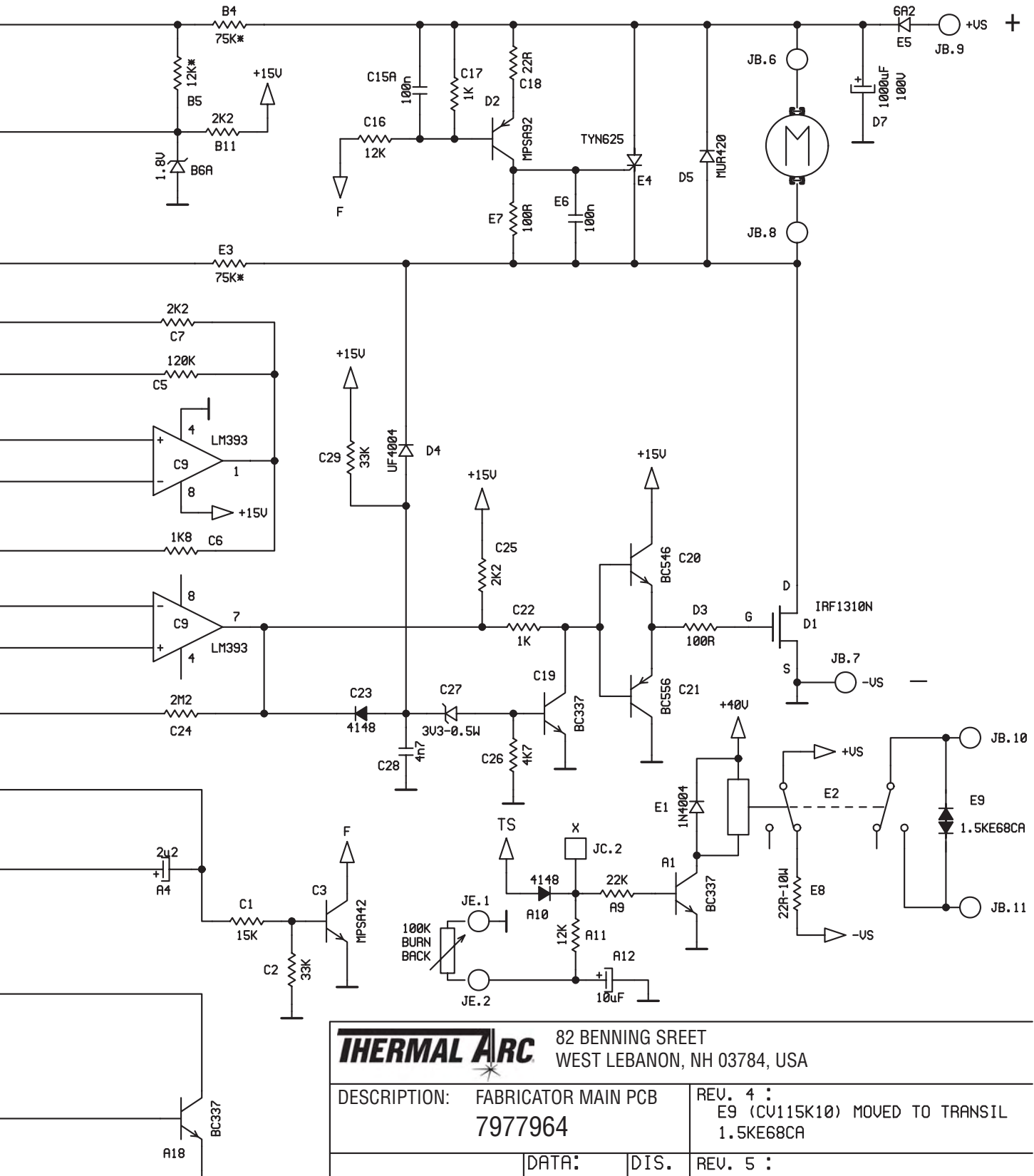


Art # A-07406

APPENDIX 4: MAIN PRINTED CIRCUIT BOARD SCHEMATIC



Art # A-07520



HERMAL ARC

82 BENNING SREET
WEST LEBANON, NH 03784, USA

DESCRIPTION: FABRICATOR MAIN PCB
7977964

REV. 4 :
E9 (CV115K10) MOVED TO TRANSIL
1.5KE68CA

RE401C.SCH

DATA:
20-10-05

DIS.
P.L.

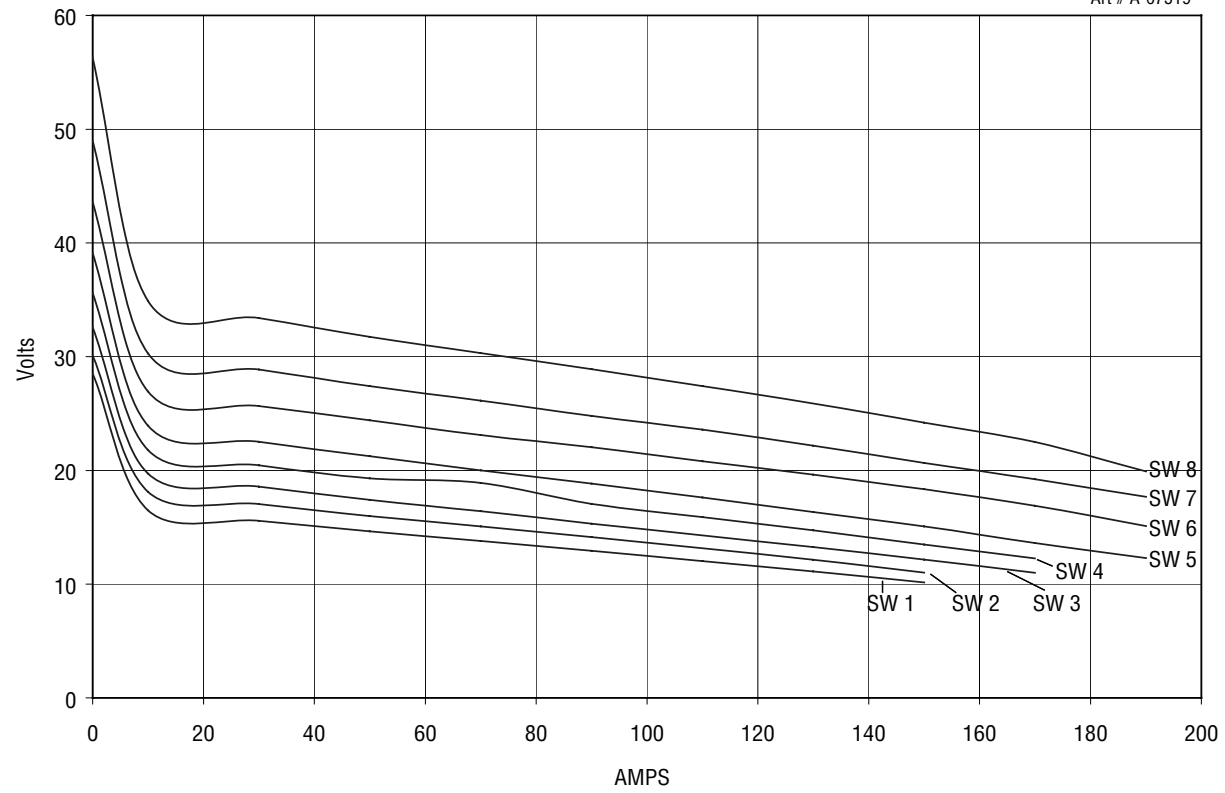
REV. 5 :
MOVED C18 TO 22R

Art # A-07520

APPENDIX 5: VOLT-AMP CURVES

Switch VA Curves

Art # A-07519



LIMITED WARRANTY

This information applies to Thermal Arc products that were purchased in the USA and Canada.

April 2006

LIMITED WARRANTY: Thermal Arc®, Inc., A Thermadyne Company ("Thermal Arc"), warrants to customers of authorized distributors ("Purchaser") that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the warranty period stated below, Thermal Arc shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with Thermal Arc's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or damage, correct such defects by suitable repair or replacement, at Thermal Arc's sole option, of any components or parts of the product determined by Thermal Arc to be defective.

This warranty is exclusive and in lieu of any warranty of merchantability, fitness for any particular purpose, or other warranty of quality, whether express, implied, or statutory.

Limitation of liability: Thermal Arc shall not under any circumstances be liable for special, indirect, incidental, or consequential damages, including but not limited to lost profits and business interruption. The remedies of the purchaser set forth herein are exclusive, and the liability of thermal arc with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by Thermal Arc, whether arising out of contract, tort, including negligence or strict liability, or under any warranty, or otherwise, shall not exceed the price of the goods upon which such liability is based.

No employee, agent, or representative of thermal arc is authorized to change this warranty in any way or grant any other warranty, and thermal arc shall not be bound by any such attempt. Correction of non-conformities, in the manner and time provided herein, constitutes fulfillment of thermal's obligations to purchaser with respect to the product.

This warranty is void, and seller bears no liability hereunder, if purchaser used replacement parts or accessories which, in thermal arc's sole judgment, impaired the safety or performance of any thermal arc product. Purchaser's rights under this warranty are void if the product is sold to purchaser by unauthorized persons.

The warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date Thermal Arc delivered the product to the authorized distributor.

Warranty repairs or replacement claims under this limited warranty must be submitted to Thermal Arc via an authorized Thermal Arc repair facility within thirty (30) days of purchaser's discovery of any defect. Thermal Arc shall pay no transportation costs of any kind under this warranty. Transportation charges to send products to an authorized warranty repair facility shall be the responsibility of the Purchaser. All returned goods shall be at the Purchaser's risk and expense. This warranty dated April 1st 2006 supersedes all previous Thermal Arc warranties. Thermal Arc® is a Registered Trademark of Thermal Arc, Inc.

WARRANTY SCHEDULE

This information applies to Thermal Arc products that were purchased in the USA and Canada.

April 2006

<u>ENGINE DRIVEN WELDERS</u>	<u>WARRANTY PERIOD</u>	<u>LABOR</u>
Scout, Raider, Explorer		
Original Main Power Stators and Inductors	3 years	3 years
Original Main Power Rectifiers, Control P.C. Boards	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year	1 year
Engines and associated components are NOT warranted by Thermal Arc, although most are warranted by the engine manufacturer	See the Engine Manufacturers Warranty for Details	
<u>GMAW/FCAW (MIG) WELDING EQUIPMENT</u>	<u>WARRANTY PERIOD</u>	<u>LABOR</u>
Fabricator 131, 181; 190, 210, 251, 281; Fabstar 4030; PowerMaster 350, 350P, 500, 500P; Excelarc 6045. Wire Feeders; Ultrafeed, Portafeed		
Original Main Power Transformer and Inductor.....	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors.....	1 year	1 year
<u>GTAW (TIG) & MULTI-PROCESS INVERTER WELDING EQUIPMENT</u>	<u>WARRANTY PERIOD</u>	<u>LABOR</u>
160TS, 300TS, 400TS, 185AC/DC, 200AC/DC, 300AC/DC, 400GTSW, 400MST, 300MST, 400MSTP		
Original Main Power Magnetics.....	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors.....	1 year	1 year
<u>PLASMA WELDING EQUIPMENT</u>	<u>WARRANTY PERIOD</u>	<u>LABOR</u>
Ultima 150		
Original Main Power Magnetics.....	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards, power switch semi-conductors	3 years	3 years
Welding Console, Weld Controller, Weld Timer	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, electric motors, Coolant Recirculator.....	1 year	1 year
<u>SMAW (Stick) WELDING EQUIPMENT</u>	<u>WARRANTY PERIOD</u>	<u>LABOR</u>
Dragster 85		
Original Main Power Magnetics.....	1 year	1 year
Original Main Power Rectifiers, Control P.C. Boards	1 year	1 year
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year	1 year
160S, 300S, 400S		
Original Main Power Magnetics.....	5 years	3 years
Original Main Power Rectifiers, Control P.C. Boards	3 years	3 years
All other original circuits and components including, but not limited to, relays, switches, contactors, solenoids, fans, power switch semi-conductors	1 year	1 year
<u>GENERAL ARC EQUIPMENT</u>	<u>WARRANTY PERIOD</u>	<u>LABOR</u>
Water Recirculators	1 year	1 year
Plasma Welding Torches.....	180 days	180 days
Gas Regulators (Supplied with power sources)	180 days	Nil
MIG and TIG Torches (Supplied with power sources).....	90 days	Nil
Replacement repair parts	90 days	Nil
MIG, TIG and Plasma welding torch consumable items.....	Nil	Nil



GLOBAL CUSTOMER SERVICE CONTACT INFORMATION

Thermadyne USA

2800 Airport Road
Denton, Tx 76207 USA
Telephone: (940) 566-2000
800-426-1888
Fax: 800-535-0557
Email: sales@thermalarc.com

Thermadyne Canada

2070 Wyecroft Road
Oakville, Ontario
Canada, L6L5V6
Telephone: (905)-827-1111
Fax: 905-827-3648

Thermadyne Europe

Europe Building
Chorley North Industrial Park
Chorley, Lancashire
England, PR6 7Bx
Telephone: 44-1257-261755
Fax: 44-1257-224800

Thermadyne, China

RM 102A
685 Ding Xi Rd
Chang Ning District
Shanghai, PR, 200052
Telephone: 86-21-69171135
Fax: 86-21-69171139

Thermadyne Asia Sdn Bhd

Lot 151, Jalan Industri 3/5A
Rawang Integrated Industrial Park - Jln Batu Arang
48000 Rawang Selangor Darul Ehsan
West Malaysia
Telephone: 603+ 6092 2988
Fax : 603+ 6092 1085

Cigweld, Australia

71 Gower Street
Preston, Victoria
Australia, 3072
Telephone: 61-3-9474-7400
Fax: 61-3-9474-7510

Thermadyne Italy

OCIM, S.r.L.
Via Benaco, 3
20098 S. Giuliano
Milan, Italy
Tel: (39) 02-98 80320
Fax: (39) 02-98 281773

Thermadyne International

2070 Wyecroft Road
Oakville, Ontario
Canada, L6L5V6
Telephone: (905)-827-9777
Fax: 905-827-9797

World Headquarters

Thermadyne Holdings Corporation
Suite 300, 16052 Swingley Ridge Road
St. Louis, MO 63017
Telephone: (636) 728-3000
Facsimile: (636) 728-3010
Email: sales@thermalarc.com

www.thermalarc.com

